CATALOGUE

OF THE

)IAN DECAPOD CRUSTACEA

IN THE

COLLECTION

OF THE

INDIAN MUSEUM.

PART I. BRACHYURA.

FASCICULUS I. INTRODUCTION AND DROMIDES OR DROMIACEA (BRACHYURA PRIMIGENIA).

BY

A. ALCOCK, M.B., LL.D., F.R.S.

INDIAN MEDICAL SERVICE, CORRESPONDING MEMBER OF THE ZOOLOGICAL SOCIETY, FELLOW OF THE GEOLOGICAL SOCIETY.
SUPERINTENDENT OF THE INDIAN MUSEUM AND PROFESSOR OF ZOOLOGY AND COMPARATIVE ANATOMY
IN THE MEDICAL COLLEGE, CALCUTTA. SOMETIME SURGEON-NATURALIST
TO THE INDIAN MARINE SURVEY.

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Preface.

The Catalogue of Indian Decapod Crustacea, of which this is the first instalment, occupied in its early preparatory stages much of the attention of my predecessor Mr. James Wood-Mason, and has in execution taken up the greater part of my own time, particularly in leisure hours, during the last eight years.

At the outset I looked forward to signalizing on the title-page my late friend's connexion with this undertaking; but I now find it necessary to take the entire responsibility of the work as it stands, and to state that the idea of codifying our knowledge of Indian carcinology originated many years ago with Wood-Mason, and that by collecting and commencing to index all the classical literature of the subject, by sorting into great-groups that part of the Museum collection of Crustacea that was made independently of the Survey Ship "Investigator," by gradually acquiring a considerable number of authentically-named species of Crustacea, and by provisionally naming a good many Indo-Pacific species himself, Wood-Mason had gone no inconsiderable way towards carrying his idea into effect.

It is proposed to issue the Catalogue in three collateral and independent series, one for the *Brachyura*, another for the *Macrura*, and a third for the *Anomura*.

A. Alcock, Major, I.M.S.,
Superintendent of the Indian Museum.

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INTRODUCTION.

This volume is the First Part of a monograph of the Decapod Crustacea of that part of the Oriental Region of Wallace which lies within the political boundaries of British India.

The *Decapoda* belong to the subclass *Malacostraca* of the Crustacean kind, the *Crustacea* being one of the main branches of the great phylum *Arthropoda*.

In the members of this phylum, which also includes the *Xiphosura*, the *Arachnida*, the Millipedes, the Centipedes, and the Insects, the body consists of a series of segments or somites carrying jointed or segmented appendages. Though the segments—with the pair of appendages which each one typically carries—may vary greatly in actual form, yet they are all built on one and the same fundamental plan, and the superficial layers of the integument, both of the somites and of the appendages, are more or less completely hardened, by chitin or by salts of lime, so as to form a rigid exoskeleton, which during growth is periodically moulted.

Among the *Arthropoda* the *Crustacea* are recognized by the fact that while they possess antennæ, as do the air-breathing Insects, Centipedes and Millipedes, they typically breathe in water by means of gills connected with the appendages, as do the non-antennate king-crabs (*Xiphosura*). Their spermatozoa are non-motile, like those of Millipedes.

Among the *Crustacea* the *Malacostraca* are distinguished by the fact that the body is made up of a definite and constant number of segments.

The characters that separate the Order *Decapoda* from the other orders of *Malacostraca* will be understood if we examine, in some detail, a typical member of the Order.

The type usually selected is the European Crayfish, *Astacus fluviatilis:* the type here chosen is the Andaman Lobster, *Nephrops andamanica*, as belonging to the local fauna.

As far as the general construction of the body, the general modifications of its appendages, and the general relations of the viscera go, any of the common species of freshwater or marine prawns (*Palæmon*, *Peneus*) may be used for dissection if *Nephrops* is not procurable.

I. Morphology of Nephrops andamanica.

1. *Of the general construction and segmentation of the Body.*

In a typical Decapod Crustacean, such as *Nephrops andamanica*, the body is elongate and is manifestly divided into two regions, an anterior region or *cephalothorax* and a posterior region or *abdomen*, of which the latter is the longer.

The cephalothorax is covered, as to its back and sides, by a shield or *carapace*, so that its segmentation—or subdivision into somites—is not immediately apparent; but the abdomen obviously consists of a series of seven segments, and therefore bespeaks our attention first.

Any one of the seven freely-movable abdominal somites, except the last, is seen to be a ring, with a pair of appendages attached to its under surface. The dorsal arc of the ring is wide fore-and-aft and is known as the *tergum*, the ventral arc is narrow fore-and-aft and is known as the *sternum*, while the overlapping sides of the ring are called the *pleura:* furthermore, the narrow corner between the articulation of the appendage and the pleurum of either side is termed the *epimerum*.

On turning to the cephalothorax, the most that we can distinguish, before the removal of the carapace, are the narrow sterna of some of the thoracic somites; and even when we have removed the carapace, and have cleared away the gills that lie beneath it, we shall at first sight find, instead of the succession of rings that the abdomen shows, merely the greatly-extended epimera of some of the thoracic somites.

The cephalothorax is, however, as an examination of its sterna and appendages reveals, made up of 14 segments, all of which are immovably fused together, many of which are contracted and foreshortened and obscured, and none of which —with the exceptions presently to be noticed—possess identifiable terga like those of the abdomen. The place of terga and pleura is taken by the carapace, the main dorsal mass of which is generally supposed—though it is not certain that this explanation covers all the facts—to be an enormous extension backwards of those elements of the 3rd (antennal) and 4th (mandibular) somites of the body.

The carapace, it is to be observed, does not merely serve as a cover to the united segments of the cephalothorax, but it overlaps those segments so as to enclose on either side of them a space in which the gill-plumes lie, this space being known as the *branchial chamber*. Moreover, it is produced forwards in the middle line, to form a stout bayonet-like organ of defence—the *rostrum*.

Although the cephalothorax is one composite whole, it consists of two ill-defined regions, an anterior cephalic region or *head* and a posterior region or *thorax*. The boundary line between the two regions is marked on the carapace by a deep semicircular groove—the *cervical groove;* and when the carapace is removed, the division between the two regions is still obscurely indicated by a

fold or a pair of lateral hollows in which a pair of organs known as *scaphognathites* (to be described along with the appendages) lie.

We shall find, on examining the appendages, that the head consists of six segments fused together, and the thorax of eight. Add to these the seven abdominal segments, and we get twenty-one as the number of segments that make up the body of *Nephrops*.

It has been questioned whether the last segment of the abdomen, known as the *telson*, is really a somite, since among other reasons it carries no appendages. But it seems probable, from the form and sculpture of this part of the body in certain deep-sea Decapods—notably the *Eryonidæ* and some *Galatheidæ*—that the telson consists of a modified somite and a pair of biramous appendages all fused together. Moreover it is traversed by the intestine.

It has also been objected that the eyes are not truly homologous with appendages and that the part from which they spring is not therefore a somite. But apart from other considerations, the fact that, as a "substitution" abnormality, the eyestalk may be replaced by a recognizable appendage, is enough to dispose of this objection.

On the other hand it has been argued that the pair of fleshy lobes that form the posterior boundary of the mouth-slit and are known as the metastoma or *lower lip*, are true appendages and therefore represent an additional somite; though there are no facts to support this view.

The cephalothorax is held together not merely by fusion of the sterna and epimera of its constituent somites, but also by an internal lattice-work of thin hard obliquely-transverse partitions known as *apodemes*.

Although the apodemes are internal and serve to protect and support the viscera as well as to give attachment to muscles, they are merely infoldings of the cuticle of the constituent sterna and epimera. They are only found behind the mouth and in the ventral half of the somites.

Before further considering the segmentation of the cephalothorax it is necessary to speak of the appendages.

2. *Of the Appendages in general.*

The recognizable appendages of *Nephrops andamanica* are twenty pairs.

The first six pairs belong to the head: three of them lie in front of the mouth and are organs of the senses, while three are crowded together on either side of the mouth and are biting and chewing organs, the last pair also contributing to the respiratory mechanism.

The next eight pairs belong to the thorax: the first three of them, which are crowded together in close succession to the mouth-parts of the head, are organs partly of manducation and partly auxiliary to respiration; while the other five are legs in the ordinary sense, though some of them are modified for prehension, and most of them take a certain part in respiration. It is from these 5 pairs of large legs that the name of the Order is derived.

The last six pairs belong to the abdomen and are primarily swimming-paddles, some of which, in the male, are modified to subserve reproduction, and in the female subserve nutrication or the care of the developing embryo.

Just as the abdomen furnishes the type of the unmodified Crustacean segment, so also it gives us the type of the Crustacean appendage.

An appendage taken from, say, the 3rd abdominal somite consists of a stalk, or *protopodite*, to the end of which two leaf-like branches are articulated, the inner branch being known as the *endopodite* the outer as the *exopodite*. The stalk itself consists of two segments, a short basal piece or *coxopodite*, by means of which it is articulated to the somite, followed by a larger sub-cylindrical *basipodite*.

Although a minority of the appendages of a Decapod Crustacean exactly conform to this description, yet they all can be referred to this general plan, or type.

3. *Of the Segments and Appendages of the Head.*

The *first* segment, or *ophthalmic somite*, is hidden by its appendages, the *eyes*. If the eyes are pushed aside, we shall find, between and just below them, a small plate of leathery consistence : this is the sternum of the ophthalmic somite, and is all that we can with safety recognize as belonging to that somite. Its appendages, the *eyestalks*, each consist of a simple two-jointed protopodite, the large compound facetted eye terminating and forming the chief part of the second joint.

The *second* segment, or *antennular somite*, is also a good deal hidden. All that we can recognize as certainly belonging to it is its sternum, which is a narrow partition between the antennules ; but the "orbits," or facets on either side of the carapace on which the eyes rest, are very probably its epimera. Its appendages are the antennules, each of which consists of a thickish stem or *peduncle* (protopodite) to the end of which two long slender tapering *flagella* (exopodite and endopodite) are articulated. The protopodite is abnormal in consisting of three segments : the proximal segment contains the *auditory sac*, the small orifice of which is seen at the inner border of the upper surface of the segment, in its posterior half. The flagella consist of a series of little rings with fine setæ : the outer, or *olfactory* flagellum, is the thicker of the two, and its setæ are larger and more thick-set, especially in its distal part.

The *third* segment is the *antennal somite* and its appendages are the *antennæ*. The broad space between the bases of the antennæ, known as the *epistome*, is the sternum of this somite, behind the outer ends of which the epimera are visible. The pleura and the tergum of this somite probably form all that part of the carapace that lies in front of the cervical groove.

Perhaps it would be better to say that, whatever other elements may enter into the formation of that part of the carapace which lies in front of the cervical groove, the pleura and terga of the third or antennular somite can, in many Macrurous and Brachyurous Crustacea, be recognized as forming the preponderating element.

Each antenna consists of a *peduncle*, a *scale* (exopodite), and a lash or *flagellum* (endopodite). The peduncle is constituted of a rather zig-zag series of five joints, the first two of which correspond with a protopodite: on the ventral surface of the first joint is a prominent orifice, the *renal tubercle*, at which the *green gland*, or excretory organ, opens. The antennal scale, which is a broad thin plate, is articulated to the end of the 2nd joint of the peduncle. The flagellum, which is slender and of great length, is made up of a succession of little rings, and articulates with the end of the peduncle: it is an organ of touch.

The *fourth* segment is the *mandibular somite* and its appendages are the *mandibles:* its modifications take the same turn as do those of the antennal somite. Its sternum is recognizable as forming the posterior part of the epistome; its pleura and tergum probably constitute the preponderating elements of that part of the carapace which lies behind the cervical groove.

It is difficult to avoid the inference that in the carapace of most *Macrura* and *Brachyura* the part which lies behind the cervical groove belongs to the mandibular somite. In most *Anomura*, however, and in some *Macrura*, the mandibular somite seems to enter into the formation of the sidewalls of the carapace only. Furthermore, the sutures of the carapace of *Thalassina* forcibly suggest that other terga and pleura, besides those of the antennal and mandibular somites, may take a considerable share in the formation of both the roof and the sidewalls of the carapace.

Each mandible consists of (1) a strongly calcified protopodite placed obliquely, and (2) a curved three-jointed palp (endopodite). The body of the mandible, or protopodite, is shaped something like a tooth: its distal end is broadened and is grooved fore-and-aft, the ventral edge of the groove forming a salient and trenchant *incisor process*, while the concealed dorsal edge of the groove forms a broadened *molar process*.

The *fifth* and *sixth* segments are only visible after the anterior appendages of the thorax are removed, and even then all that is seen of them is a little plate lying in the middle line, behind the mouth, and representing their conjoint sterna, to which they are reduced. It is also possible that their pleura are represented —though their individuality is, of course, completely lost—by a part of the edge of the carapace in their own immediate neighbourhood. Both these somites are, however, represented by appendages.

The appendages of the *fifth* somite are the *1st maxillæ:* They are thin foliaceous chewing-organs, and lie in contact with the mandibles. Each consists of (1) a leaf-like exopodite and basipodite, both of which have their long axis nearly transverse and their free (distal) end fringed with setæ, and (2) a two-jointed endopodite or *palp*. The exopodite is not present.

The appendages of the *sixth* somite are the *2nd maxillæ*. All their parts are thin and foliaceous. The coxopodite and basipodite resemble those of the 1st maxillæ, except that each is deeply cleft into two lobes. There is a tapering endopodite, and a leaf-like exopodite, which last, being used to bale out the branchial chamber in the course of respiration, goes by the special name of *scaphognathite*.

4. *Of the Segments and Appendages of the Thorax.*

The individuality of all eight thoracic somites is maintained by the sterna, which can be seen without removal of the carapace, and by the epimera which can only be seen after the carapace is removed. The individuality of their pleura and terga is entirely lost, but it is possible that the slightly-raised lateral and posterior borders of the carapace represent these elements. We need, therefore, consider in detail only the appendages.

The fate of the terga and pleura of the thoracic somites has already been incidentally considered in dealing with the composition of the carapace.

I have adopted with slight modification the views of Milne Edwards I., that the carapace is formed by the terga and pleura of the antenno-mandibular somites, and that these elements of the thoracic somites are practically unrepresented in the carapace.

It must be admitted however that the sculpturing and sutures of the carapace admit of other equally reasonable interpretations. For instance, Huxley (*The Crayfish*, p. 156) taught that that part of the carapace which lies in front of the cervical groove represents the terga and pleura of the head; while of that part which lies behind the cervical groove, the median region represents the terga, and the lateral regions represent the pleura, of the *thoracic* somites. The sutures of the carapace of *Thalassina* certainly support this interpretation, and even in the carapace of *Nephrops* there are grooves and spines which harmonize with it.

The *first* pair of thoracic appendages are the *1st maxillipeds*. They consist of a protopodite, endopodite and exopodite, with, in addition, a leaf-like appendix having the same function as the scaphognathite and known as an *epipodite*. The protopodite is formed of a leaf-like coxopodite and basipodite similar to, only larger than, the same elements of the 1st maxillæ: the endopodite is a thin two-jointed leaf; the exopodite, which is longer and slenderer than the endopodite, ends in a truncated *flagellum*: the epipodite is attached to the outer end of the coxopodite. Their function, like that of the next two pairs of appendages, is partly manducatory, partly respiratory, and in structure they are intermediate between maxillæ and ordinary maxillipeds.

The *second* pair of thoracic appendages are the *2nd maxillipeds*. They are foot-jaws in which their function as organs of mastication has not disguised their resemblance to the ordinary appendages of the thorax. They consist of a protopodite, an endopodite, an exopodite, and an epipodite to the base of which a rudimentary gill-plume or *podobranch* is attached. The protopodite consists of a short coxopodite and basipodite: the endopodite, which is larger and longer

than the exopodite, is made up of the following five successive pieces, (1) a short *ischiopodite*, which is immovably united with the basipodite, (2) a long *meropodite*, (3) a short *carpopodite*, (4) a short and broad *propodite*, and (5) a semioval *dactylopodite*. The slender exopodite resembles that of the 1st maxillipeds.

The *third* pair of thoracic appendages are the *third* or *external maxillipeds:* they are foot-jaws in which the resemblance to the ordinary appendages of the thorax is more decided than in the case of the other maxillipeds. Except that their endopodite is longer and their exopodite shorter, and that their ischiopodite is longer and their meropodite relatively shorter, and that their podobranch is a functional gill-plume, they do not essentially differ from the 2nd maxillipeds. The inner edge of their ischiopodite is, however, furnished with an elegant row of calcareous teeth.

The fourth to the eighth pairs of thoracic appendages, which are commonly known as "legs," are modified for locomotion and, in part, for prehension, and though they are not all exactly alike, have all an essential similarity of structure. None of them have an exopodite, and in all of them the endopodite consists of five subcylindrical segments, or joints—ischiopodite, meropodite, carpopodite, propodite, and dactylopodite—which form, in succession, a continuous series with the coxopodite and basipodite, all of these joints being capable of independent motion, except the basipodite and ischiopodite which are firmly united and move as a single piece. All of these appendages except the last have, articulated to the dorsal angle of the coxopodite, an epipodite and a podobranch.

The *fourth* pair, which are known as the *great chelipeds*, are much the longest and vastly the most massive of the appendages of the thorax: their propodite is of enormous size and has its distal angle produced far beyond the articulation of the dactylopodite as a long process, which is a counterpart of the dactylopodite itself and forms with the dactylopodite a pair of strong pincers—the *chelæ*.

The *fifth* and *sixth* pairs are slender and subcylindrical: they also end in chelæ, which are small.

The *seventh* and *eighth* pairs are simple legs for crawling, the seventh are a little longer than, and the eighth are about the same length as, the fifth and sixth pairs.

5. *Of the Segments and Appendages of the Abdomen.*

The typical abdominal segment, and its appendages, have already been described. The segments are all freely movable: the tergum of the first segment is overlapped by the carapace and overlaps the tergum of the second, the tergum of the second is overlapped by that of the first and overlaps that of the third, and so on in succession.

The *first* abdominal somite differs from the others in the large extent of

its epimera and the small and rudimentary character of its pleura, in these respects approaching to the thoracic somites. Its appendages also differ from those of the other abdominal somites in being uniramous. The first pair of abdominal appendages are alike in both sexes, in so far as they consist of a protopodite followed by a single branch, probably the endopodite; but whereas in the female they are slender, in the male they are stout and are deeply grooved along their inner face so as to form, by their apposition, a canal. Their apposition is rendered as intimate as possible by the interlocking of a little roughened facet on the inner edge of each. The canal forms a passage for the sperm, and these appendages in the male are commonly spoken of as *copulatory organs*.

The *second* abdominal somite is distinguished by the large size of its pleura, but is in all respects typical. Its appendages in the female are quite typical; but in the male they are characterized by the presence of a little lobe on the inner edge of the base of the endopodite, which little lobe can be securely apposed to its fellow of the opposite side, so that both can play in the canal formed by the apposition of the first pair of appendages, and they must therefore be regarded as accessory organs of copulation.

The *third* to the *fifth* abdominal somites are quite typical, as also are their appendages, which are biramous setose swimming-paddles constructed on the plan already described. In the female these appendages, as also those of the 2nd somite, are used at the breeding-season for carrying the fertilized ova and the newly-hatched young.

The *sixth* abdominal somite has the pleura less well developed, and the sternum more strongly developed, than those of the other abdominal somites. Its appendages, which are known as the *caudal swimmerets*, are strongly calcified and of large size, and they form with the last abdominal somite the great tail-fan, which is the principal organ of aquatic locomotion. In these appendages the protopodite is short and broad, the exopodite and endopodite are broadly foliaceous, and the exopodite is transversely divided in its distal moiety into two segments.

The *seventh* abdominal somite is the *telson*, which differs from all the other somites in being a broad thin plate without appendages. On this account, and also because it is destitute of a nerve-ganglion, it is sometimes regarded as merely an outgrowth of the sixth somite. But the facts that the alimentary canal perforates it, and that in many deep-sea species of Decapoda it can apparently be resolved into a somite and a pair of appendages all fused together, are held sufficient to justify its inclusion in the series of somites.

6. *Of the Respiratory Organs.*

The organs of respiration of the Crustacea are so intimately connected with the appendages, that they must be treated in immediate sequence to them.

The gills of *Nephrops andamanica* are attached on either side to the epimera and appendages of certain of the thoracic somites. The space on either side in which they lie is known as the gill-chamber: its inner wall is formed by the epimera of the thoracic somites, its outer wall is formed by the side-wall of the carapace, or *branchiostegite*.

In respiration water is drawn under the edge of the branchiostegite into the branchial chamber, and streams forwards over the gills, until it passes out again between the anterior edge of the branchiostegite and the epistome, the current being maintained chiefly by the movements of the *scaphognathite*, already described in connexion with the 2nd maxillæ.

There are twenty gills on either side, though the most anterior of them, which is attached to the 2nd maxillipeds, is a rudiment.

They are arranged in three series in either branchial chamber: those of the outer series, which with the epipodites are attached to the coxopodites of the appendages, are known as *podobranchiæ;* those of the middle series, which are attached to the membranes that connect the coxopodites with their somites, are known as *arthrobranchiæ:* while those of the inner series, which are attached to the epimera of the somites, are known as *pleurobranchiæ*.

The podobranchiæ are six in number on either side, including the rudimentary one, and are attached one to each of the following appendages: the 2nd maxillipeds (rudiment), the external maxillipeds, and the first four thoracic legs.

The arthrobranchiæ are ten on either side, and are attached in pairs to the external maxillipeds and the first four thoracic legs.

The pleurobranchiæ are four on either side, and are attached to the epimera of the last four thoracic somites.

The number and disposition of the gills is expressed in the following *branchial formula*, in which the thoracic somites are numbered in serial succession to the six somites of the head:—

The Branchial Formula of Nephrops andamanica.

Somites and their appendages.	Podobranchiæ and Epipodites.	Arthrobranchiæ.		Pleuro-branchiæ.	
		Anterior.	Posterior.		
VII	0 ep.	0	0	0	= 0 + ep.
VIII	*r + ep.	0	0	0	= r + ep.
IX	1 + ep.	1	1	0	= 3 + ep.
X	1 + ep.	1	1	0	= 3 + ep.
XI	1 + ep.	1	1	1	= 4 + ep.
XII	1 + ep.	1	1	1	= 4 + ep.
XIII	1 + ep.	1	1	1	= 4 + ep.
XIV	0	0	0	1	= 1
Total	5 + r + 7 ep.	5	5	4	= 19 + r + 7 ep.

* Very small.

Each gill consists of a multitude of stiffish vascular filaments, arranged round a central stem, to form an elongate-pyramidal plume or brush. Very long thread-like *setæ* are also connected with the gill-plumes, and are numerous enough to form by their interlacing a sort of adjustable straining apparatus to keep the gills from getting clogged by dirt.

The structure and arrangement of the gills are of the highest value in the classification of the higher Crustacea. On this subject see Huxley, on the *Classification and Distribution of the Crayfishes*, Proceedings of the Zoological Society for 1878, pp. 752–788.

7. *Of the Digestive System.*

The digestive system of Nephrops consists of the *alimentary canal* and of a pair of large *digestive glands*.

The *alimentary canal* is a tube, of which the anterior part is greatly expanded to form a stomach: it is for the most part thin-walled, and it passes with a single curve, but without any coiling, straight through the body from the mouth, which lies behind the 4th (mandibular) sternum, to the anus, which perforates the ventral surface of the telson.

The *mouth* is a longitudinal median chink, bounded in front by an overlapping fold of the integument termed the *labrum* or upper lip, and behind by a pair of fleshy leaves known as the *metastoma* or lower lip. On either side of the mouth are the powerful mandibles, upon which, like the leaves of a book, lie the two pairs of maxillæ and the 1st pair of maxillipeds, these being closely followed by the last two pairs of maxillipeds.

A short "gullet" leads upwards from the mouth into the capacious stomach: like the stomach, it is lined by an invagination of the cuticular exoskeleton which is cast off every time the animal moults.

The *stomach* is divided into two chambers—a wide anterior one in the roof of which is a powerful crushing-apparatus formed by three *gastric teeth*, one median and two lateral, and a narrower posterior chamber furnished with hairs which interlace to form a filter.

From the posterior or *pyloric* chamber the narrow intestine passes straight back to the vent.

On either side of the stomach and anterior part of the intestine, the cavity of the body is filled by a large *digestive gland*. This paired gland consists of a vast number of tubules, which at length discharge into a duct that opens into the anterior part of the intestine on either side.

8. *Of the Circulation of the Blood.*

The blood is colourless, and the circulatory system consists of a heart and thin-walled blood vessels.

The *heart* lies just beneath the dorsal surface of the carapace, in the middle line, behind the cervical groove. It is enclosed in a semi-transparent sack known as the *pericardium*, which also contains blood. The cavity of the heart communicates with the cavity of the pericardium by three pairs of valvular openings (*ostia*), so that blood can pass from the pericardium into the heart, but not in the reverse direction.

From the heart seven main *arteries* carry pure arterial blood to all parts of the body. The ultimate ramifications of these arteries open freely into the interstices of the tissues, whence the blood, after bathing the tissues, is at last collected in *venous sinuses* by which it is transported to the gills. After becoming aerated in the gills, the blood passes by definite vessels into the pericardium and so returns to the heart through the ostia in its walls.

9. *Of the Renal Excretory System.*

The organs corresponding in function with the kidneys of higher animals are a pair of tubular coiled *green-glands*. These are lodged in the antero-lateral corners of the cephalothorax and open at a tubercle on the basal joint of the antennal peduncle.

10. *Of the Central Nervous System.*

The central nervous system is of the ordinary Arthropod type. It consists (1) of a large composite *cerebral ganglion* placed immediately in front of the gullet and behind the eyes in the middle line of the body, (2) of a continuous *ventral cord* or *chain of ganglia* running along the whole length of the ventral or sternal aspect of the body, in the middle line, as far as the penultimate abdominal somite, the ganglia of the chain corresponding in a general way with the segmentation of the body, and (3) of a pair of *commissures* which form a long narrow collar round the gullet and connect the cerebral ganglion with the ventral chain.

The cerebral ganglion, which is really double, gives off nerves to the eyes, antennules, and antennæ, and to the muscles which move those appendages. The ganglia of the ventral chain send off nerves to all other parts of the body.

[The *Voluntary Muscles* of Nephrops, like those of Arthropoda in general are made up of multi-nucleate striped fibres, and their tendons are derived from invaginations of the integument (exoskeleton)].

11. *Of the Organs of Reproduction.*

These in the male are coiled tubular glands, which open upon the coxopodites of the last pair of thoracic appendages (5th pair of legs).

In the female the oviducts open upon the coxopodites of the 3rd or antepenultimate pair of thoracic legs.

As already mentioned the 1st pair of abdominal appendages are modified to assist the reproduction of the species.

The eggs when laid are attached to the 2nd–5th pairs of abdominal appendages of the female, and the young when hatched do not differ greatly from the adult in form.

We have no evidence on this point, but from the observations of Spence Bate upon the common shore-crab of England, of Coste upon the crayfish and certain crabs, of Andrews on *Cambarus*, of Wilson on *Cancer pagurus*, and of Brandes on *Galathea* and *Eupagurus*, we may probably conclude that the eggs are fertilized before they are laid, as in the case of the air-breathing Arthropods.

12. *Of Moulting or Exuviation.*

In its growth from the young to the adult stage and even beyond it, the exoskeleton is periodically moulted.

At each moult the entire cuticle of the body and its appendages is shed bodily like a mould, and with it the lining membrane of the stomach and the gastric teeth.

After casting its exoskeleton, the animal remains for some days soft and flabby, until the new cuticle hardens.

It seems probable that although this process of moulting takes place periodically throughout the greater part of the life of the animals of this class, yet that at last a limit of growth is reached and exuviation ceases: for we often find old crabs encrusted with barnacles and tubicolous annelids which have evidently been attached for a long time.

The Decapod Crustacea have also a certain power of renewing appendages, or parts of appendages, that have been accidentally lost. From the stump of the lost part a bud grows out, which in course of successive moults acquires the form of the lost part. In consequence of this facility of repair, these Crustacea will often voluntarily, on sufficient occasion, discard an appendage.

On the general morphology and organization of the Decapod Crustacea the following works must be consulted:—

H. Milne Edwards, *Histoire Naturelle des Crustacés*, Vol. I.

De Haan, *Fauna Japonica, Crustacea.*

Dana, United States Exploring Expedition, *Crustacea*, Part I.

Bell, *History of British Stalk-eyed Crustacea*, Introduction.

Huxley, the Crayfish (International Scientific Series).

Boas, *Studier over Decapodernes Slægtskabsforhold* (Vidensk. Selsk. Skr., 6 Række, naturvid. og mathemat. Afd. I. 2. Kjobenhavn, 1880).

Gerstæcker and Ortmann, *Malacostraca* in Bronn's Klassen und Ordnungen des Thier-Reichs.
Spence Bate, *Report on the Challenger Crustacea Macrura*, Introduction.
Stebbing, *A History of Crustacea* (International Scientific Series).

II. Classification of the Decapoda.

Although the views of Boas, who divides the Crustacea of the Malacostracous Order Decapoda into two suborders *Natantia* and *Reptantia*, have much to commend them, yet I prefer to follow Milne Edwards I. and Dana (from whom also DeHaan is not essentially divergent) who recognize three principal groups of Decapoda, namely, *Macrura*, *Anomura* or *Anomala*, and *Brachyura*.

Of these three suborders the *Macrura* occupy the middle place, having intimate connexions on the one hand with the *Anomala* (*Anomura*) and on the other hand with the *Brachyura*, while so far as can be seen at present, the two latter groups (*Anomala* and *Brachyura*) are not connected with one another in any other way but through the *Macrura*.

The most obvious links between the *Macrura* and the *Anomala* (*Anomura*) are (1) the Thalassinoids, which are almost united with the Paguroids through the curious symmetrical hermit-crab *Pylocheles*, and (2) the Uroptychoids, which, through *Ptychogaster*, have a less striking connexion with the Astacoids. On the other hand the interval between the *Macrura* and *Brachyura* is almost bridged by the deep-sea Dromioid genera *Homolodromia* and *Archnodromia*.

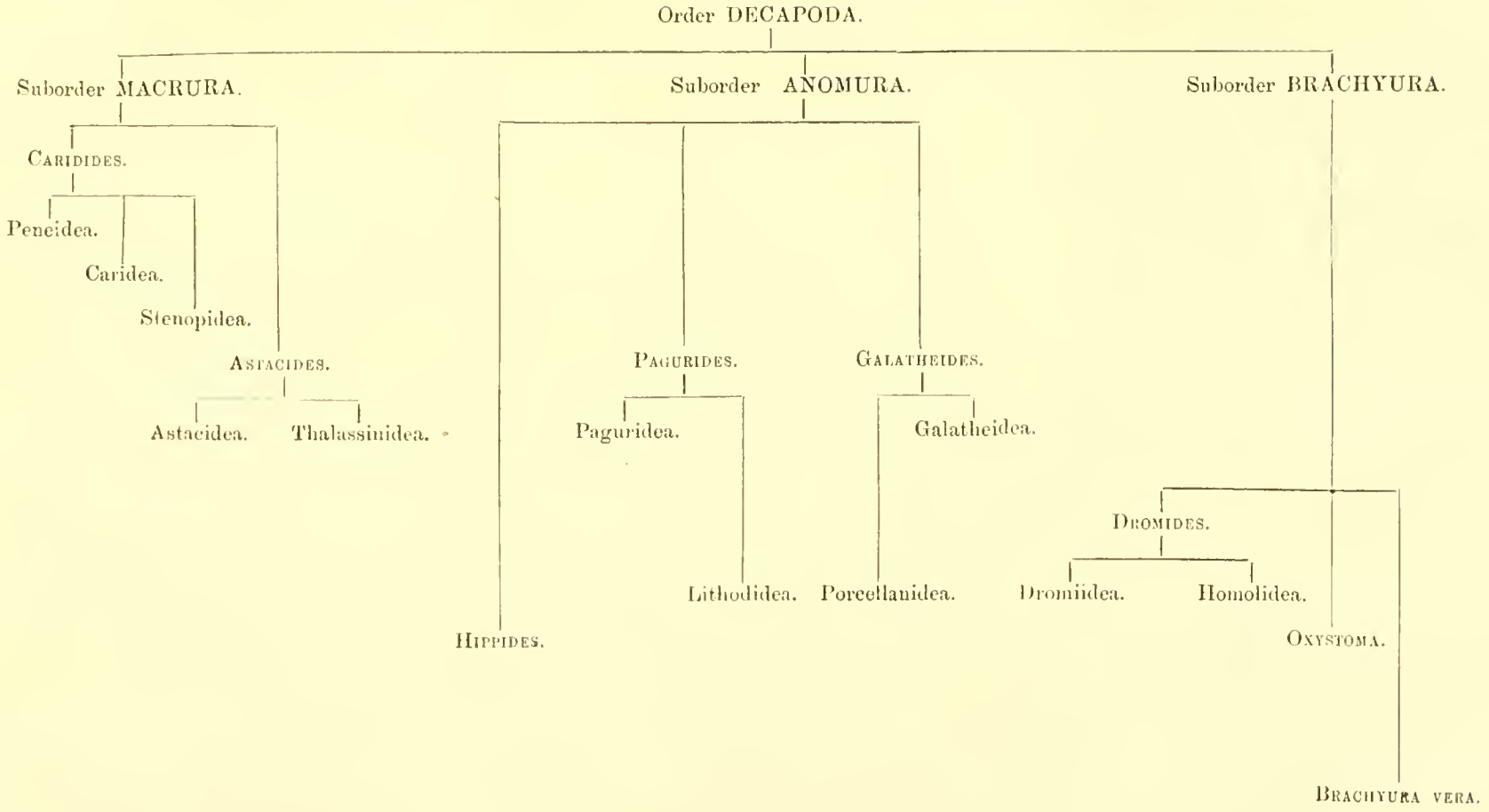
The three suborders of Decapoda are thus defined :—

Suborder I. Macrura. Body elongate. Abdomen as well developed as, or even better developed than, the cephalothorax, behind which it is more or less completely extended and beneath which it is never permanently flexed, and ending in a large symmetrical tailfan the lateral lobes of which (caudal swimmerets) are almost without exception foliaceous. Front not joined with the epistome. Thoracic sternum usually narrow: if broad, the last segment is not independently movable. The genital ducts never open on the sternum. The antennal peduncle commonly, though not universally, carries a movable exopodite, which is generally foliaceous.

Suborder II. Anomala or Anomura. Abdomen less well developed than the cephalothorax: although in a few exceptional forms it is elongate and symmetrical and extended in a straight line behind the cephalothorax, it is as a rule either (1) flexed or rolled on itself, or (2) flexed against the sternum, or (3) coiled in a spiral, in which last case it is more or less soft and asymmetrical. It is only exceptionally that the 6th abdominal somite is destitute of appendages homologous with caudal swimmerets. The front is not united with the epistome across the ophthalmic somite. The last thoracic segment is independent, the last segment of the thoracic sternum, when not atrophied, being movable. The genital ducts never open on the sternum. If the antennal peduncle carries an exopodite, this is never foliaceous.

Suborder III. Brachyura. Abdomen much less well developed than the cephalothorax beneath which it is folded: its 6th somite is almost always destitute of appendages, but if, as is rarely the case (*Dromiidea*), they are present, they appear in a modified form as a pair of small lateral plates intercalated between the 6th and 7th somites. The front is joined with the epistome across the hidden ophthalmic somite to form an interantennular septum. Thoracic sternum usually, but not universally, broad, the last segment is fused with the others. The antennal peduncle never carries a movable exopodite. The genital ducts of the female usually, but not always, open on the sternum; those of the male sometimes do.

TABLE OF CLASSIFICATION OF THE DECAPOD CRUSTACEA.



THE BRACHYURA.

I. The Brachyura in General.

1. *Of the General Form of the Body in the Brachyura.*

In the Crabs, as in *Nephrops*, the body is divided into two regions—a cephalothorax consisting of 14 somites fused together, and an abdomen consisting of 7; but the abdomen of the crab is very much smaller than the cephalothorax, beneath which it is usually folded out of sight, being often, in fact, in the male little more than a rudiment.

As in *Nephrops*, the cephalothorax is covered by a large overlapping carapace, which, however, is usually broader than long.

Moreover, although the abdomen as a whole is moveable, yet it is very common to find some of its somites fused together: the abdominal terga do not overlap one another, hardly ever are any of the sterna calcified, and hardly ever are there recognizable pleura.

There are certain undoubted crabs (*e.g.*, the *Raninidæ*) in which the cephalothorax is much longer than broad and the abdomen, though reduced in size, is by no means folded out of sight.

Moreover there are other Decapoda besides crabs (*e.g.*, the *Lithodidæ* and *Porcellanidæ*) in which the carapace may be broader than long and the abdomen is folded beneath it.

In the great majority of crabs the anterior end of the carapace is not prolonged to form a rostrum, but is, on the contrary, truncated and often deflexed. As a result of this the eyestalks, instead of lying close together in the longitudinal axis of the body, are forced asunder and pushed back, until they lie almost in the transverse axis of the body. A similar but less marked change of position is usually seen in the antennules and antennæ.

Moreover, both the eyes and the antennules become more or less enfolded or embedded in pits. When these pits are shallow and the second joint of the antennal peduncle remains free, as in the *Dromides*, we find a pair of common orbito-antennular fossæ into which the eyes and antennules are, or are not, completely retractile. But when, as in most crabs, the second joint of the antennal peduncle becomes more or less fixed, we find distinct *antennular fossæ* into which the antennules can be folded, and distinct *orbits* for the eyes, the second joint of the antennal peduncle forming the partition between the two cavities.

There are numerous crabs (*e.g.*, the *Oxyrhyncha*) in which the carapace is produced anteriorly to form a rostrum, but in this case the rostrum *always sends down from its under surface a process that separates the antennules from one another.*

Again there are many crabs, besides the *Homolidea*, in which the eyes are not concealed in orbits, and there are some crabs in which the eyes, though broadly separated from one another, are not pushed out at right angles to the sagittal axis of the body.

On the other hand there are numerous Decapoda, besides crabs, in which no rostrum is present; and in some Loricate Macrura the eyes lie at right angles to the long axis of the body and are embedded in perfect orbits, though these are not formed in the same way as the Brachyurous orbit.

The segments of the cephalothorax are immovably united together, as in *Nephrops*, but the sterna of the last 5 or 6 segments are of great breadth.

The relative breadth of the Brachyurous "sternum" is very variable. In the *Raninidæ* the posterior thoracic sterna are even narrower than in *Nephrops*. On the other hand there are many Decapods besides crabs, *e.g.*, the Loricates, the Galatheoids, the Porcellanoids, and the Lithodoids, in which there is a broad "sternum."

As in *Nephrops*, the cephalothorax is strengthened, without unnecessary increase of weight, by an internal framework of apodemes. In most crabs in addition to the transverse apodemes there is a longitudinal apodeme—the *median apodeme*—formed by an infolding of the cuticle of some of the posterior thoracic sterna in the middle line, and united posteriorly with the fused and infolded endosternal apodemes of the last thoracic sternum.

In the *Dromides* alone there is no median apodeme; but the inner or endosternal apodemes of the last thoracic sternum are strongly infolded longitudinally, so as to lie close together in the middle line of the body and thus to form the beginnings of a median apodeme.

The carapace of the Brachyura and its sutures and grooves will be considered subsequently.

2. *Of the Appendages of the Brachyura.*

The appendages of the cephalothorax correspond very closely with those of *Nephrops* from which they differ only in certain details of form.

The *1st pair of appendages of the head* are the *eyes*: these are borne on protopodites, of which the coxal joint is usually concealed, although in some crabs (e.g., *Homola*) it is of considerable length and is fully exposed, and they are commonly lodged in *orbits*.

The simplest form of orbit (seen in the *Dromiacea*) is a shallow cavity into which both the eye and the antennule are retractile: the most perfect form of orbit is a deep pocket complete on all sides and completely separated from the antennular fossæ. In a considerable number of crabs the orbits are wanting.

The *2nd pair of appendages of the head* are the *antennules*, which resemble those of *Nephrops* in composition, but differ conspicuously in the extreme shortness of their flagella, and in being as a rule retractile into pits (*antennular fossæ*) beneath the front.

There are other Decapod Crustacea, besides crabs, in which the antennules are more or less folded and their flagella much abbreviated. On the other hand, there are not a few crabs in which antennular fossæ are either altogether absent, or are not distinct from the orbits.

In all Brachyura, however, the basal joints of the antennular peduncles are separated from one another by an *inter-antennular septum* formed by the union of the *front* with the *epistome*.

The *3rd pair of appendages of the head* are the *antennæ*, which differ from those of *Nephrops* in never having a movable antennal scale, and in the reduced length of the flagellum: moreover owing to complete fusion between the 2nd and 3rd joints (which form the so-called "basal joint") the antennal peduncle consists of only four joints, of which the 1st, or true basal joint, is, in crabs above the level of the *Dromides* and *Raninidæ*, reduced in size, fixed, and more or less concealed. There are a good many crabs, especially among the Oxystomes, in which the antennæ are quite rudimentary.

There are certain Macrura (*e.g.*, the Loricates) and plenty of Anomura, in which the 2nd and 3rd joints of the antennal peduncle are fused to form a single piece and the size and mobility of the 1st joint are considerably decreased.

The 4th, 5th and *6th pairs of appendages of the head* are, respectively, mandibles and two pairs of maxillæ not essentially different from those of *Nephrops*. The fold of the carapace in which these appendages, along with the three pairs of maxillipeds, lie is deep and is, usually, very distinctly delimited both at the sides and in front: it is known as the *buccal cavern*, and its roof—*i.e.*, the part that lies between the epistome and the labrum—is known as the *endostome* or "palate."

The *appendages of the thorax* do not essentially differ from those of *Nephrops*: the first three pairs are foot-jaws or maxillipeds, the fourth pair are great chelipeds, and the last four pairs are ambulatory legs which are never truly chelate though sometimes the last pair or last two pairs may be subchelate.

The *1st* and *2nd maxillipeds* resemble those of *Nephrops*, but in the 1st maxillipeds the endopodite and epipodite are usually much larger, and in the 2nd maxillipeds the exopodite is usually longer and broader and the podobranch is usually well developed.

The *3rd* or *external maxillipeds* have, in the great majority of crabs, quite lost their pediform character and become broad valves or folding-doors that completely close the broad buccal cavern in which all the other mouth-parts lie, so that these are all concealed from view. This change in the character of the external maxillipeds is mainly brought about by a broadening and flattening of the ischiopodite and meropodite: the three terminal joints usually, but by no means always, remain small and form a sort of "flagellum" or "palp" to the enlarged meropodite. The exopodite, which is sometimes spoken of as the *exognath*, may either remain comparatively slender or may become as much broadened as the ischiopodite and meropodite.

There are, however, many crabs in which the external maxillipeds are almost as distinctly pediform as they are in *Nephrops*, and do not conceal the other appendages of the mouth: in

fact, we meet with every gradation between pediform and opercular external-maxillipeds. On the other hand, there are a few Decapods outside the limits of the Brachyura, in which the external maxillipeds are opercular.

In no crabs above the level of the *Dromides* are epipodites or podobranchiæ found on any of the last five thoracic appendages.

N.B.—In the larger chelipeds of crabs the meropodite is frequently spoken of as the "arm," the carpopodite as the "wrist," and the propodite and dactylus together as the "hand," the body of the propodite being the "palm," its process being the "fixed finger," and the dactylus being the "movable finger."

The *appendages of the abdomen*, like the abdomen itself, are of a rundimentary or, at least, subordinate character.

In the male they are present on the first two abdominal somites only, and are completely modified to form uniramous organs of copulation.

In the female they are present on the 2nd, 3rd, 4th and 5th somites as slender setose biramous appendages to which the eggs, when laid, are attached. In the *Dromides* alone the 1st abdominal somite has a pair of appendages, which are slender short and uniramous.

In no crab does the 6th abdominal somite carry appendages: in the *Dromiidea* alone are these appendages represented—and then in a much modified form—by a pair of little plates intercalated between the 6th and 7th abdominal somites.

In certain other Decapods, besides crabs, the abdominal appendages are reduced in size and number in one or both sexes. Instances occur among the Loricata, the Pagurids, and the Galatheids; but here we always find the appendages of the 6th somite present. Among the *Lithodidæ* however even the appendages of the 6th somite are absent.

3. *Of the Organs of Respiration of the Brachyura.*

As in *Nephrops*, the gills are attached on either side of the body to the epimera and appendages of certain of the thoracic somites, and lie in a branchial chamber formed by the overlapping of the carapace on either side. Into this chamber the water used in breathing finds its way, usually but not invariably by a valvular orifice situated between the basal joints of the chelipeds and the neighbouring margin of the carapace, and from it the water, when done with, is expelled by a channel running in either side of the buccal cavern, the current being maintained by the scaphognathite of the 2nd maxilla and the epipodites of the maxillipeds, especially those of the 1st pair. The entry to the chamber is the *afferent branchial orifice*, the exit from it is the *efferent branchial canal*. In the Oxystome crabs the efferent branchial canals unite and traverse the endostome in the middle line, and in many Oxystomes the afferent branchial canals lie on either side of the endostome.

The number of gill-plumes in either branchial chamber varies from 20 to 6, but the typical number is 9, arranged as follows:—

The Branchial Formula of Scylla serrata.

Somites and their appendages.	Podobranchiæ.	Arthrobranchiæ.		Pleuro-branchiæ.	
		Anterior.	Posterior.		
VII	0 ep.	0	0	0	= 0 ep.
VIII	1+ep.	1	0	0	= 2+ep.
IX	1+ep.	1	1	0	= 3+ep.
X	0	1	1	0	= 2
XI	0	0	0	1	= 1
XII	0	0	0	1	= 1
XIII	0	0	0	0	= 0
XIV	0	0	0	0	= 0
Total	2+3ep.	3	2	2	= 9+3ep.

In the typical crabs the gills are *phyllobranchiæ;* that is to say, the gill-elements are broad thin leaves arranged in two series along a central stem, like the barbs of a feather-vane. There are however, among the *Dromides*, to be found trichobranchiæ and gills of an intermediate character.

In certain land-crabs although functional gills are present, aerial respiration is in part carried on by the remarkably thick and vascular lining-membrane of the branchial chambers.

4. *Of the Visceral Systems.*

Except for the better definition of the buccal cavern and for the valviform modification of the external maxillipeds, the *Digestive System* of the Brachyura is not essentially different from that of Nephrops.

Crabs feed in a very human fashion. Holding the food in one of the large chelæ, they tear off pieces with the other and carry the morsels to the mouth.

The *Circulatory* and *Renal Excretory Systems* do not differ essentially from those of Nephrops. Nor does the *Central Nervous System*, except that, in correspondence with the shortening-up of the body, the ganglia of the ventral chain are all united into a central mass or ring from which the nerve-cords radiate.

In the *Dromides*, however, this concentration of the ventral ganglia is not quite complete.

5. *Of Reproduction among Brachyura.*

The reproductive organs resemble those of Nephrops. In the male their ducts usually perforate the coxopodite of the last pair of thoracic legs, but

sometimes they perforate the corresponding segment of the sternum. In the female they usually open, near the middle line of the body, on the sternum corresponding with the ante-penultimate pair of legs, but occasionally they perforate the coxopodites of these appendages themselves.

The ova are impregnated internally, the organs of insemination being the modified 1st and 2nd pairs of abdominal appendages of the male. Of these the 1st pair are the largest, and are made up of a propodite followed by a long rigid exopodite which is rolled like a scroll to form a hollow tube of considerable length. The 2nd pair are slender and consist of a propodite followed by a styliform endopodite which is either closely applied to the preceding appendage or is actually lodged in its channel.

The extruded ova, which are small and very numerous, are attached to the setose abdominal appendages of the female until they are hatched.

In all the Brachyura except a few species of land-crabs the young leaves the egg as a *zoæa*.

In the typical crab-zoæa the body consists of a cephalothorax enclosed in a carapace, followed by a slender six-jointed abdomen that terminates in a fork.

The carapace is usually armed with four large spines, namely, one pointing forwards and corresponding with the rostrum, one very large one pointing backwards, and one on either side.

The abdomen is without appendages, but the following cephalothoracic appendages are present:—large stalked eyes, uniramous antennules, non-flagellate antennæ provided with an antennal scale, large mandibles consisting of propodite only, two pairs of maxillæ differing little in composition from those of the adult, and two pairs of large biramous maxillipeds which are the principal organs of locomotion at this free-swimming stage.

In the course of a series of moults the remaining appendages are gradually acquired and at the last moult the zoæa changes into a *Megalopa*.

In the Megalopa the cephalothorax is much broader than in the zoæa and its spines are usually much reduced in size. The abdomen though relatively shorter than in the zoæa is still of considerable size, and though curved is carried out behind the cephalothorax: it consists of 7 segments and the terminal fork is replaced by an oval telson, and the abdominal appendages are present.

By a further series of moults the Megalopa gradually changes into the adult form.

6. *Of the Brachyurous Carapace.*

In the typical crabs the carapace is a transversely-oval shield with sharply defined *lateral borders* that separate the dorsal surface from the sidewalls, and marked by certain *sutures* and *grooves* which delimit definite areas or *regions*.

The most constant suture is one that runs along either sidewall, in a more or less sinuous course, from the antero-lateral angle of the buccal cavern to the postero-lateral angle of the carapace. This, which is known as the *epimeral suture*, cuts off on either sidewall a ventral piece which may with much reason be regarded as, in the main, the pleurum of the 4th or mandibular somite of the head.

The cervical groove, which is so conspicuous in Nephrops, can generally be made out, though obscurely, on the Brachyurous carapace. It is most distinctly traceable in the *Dromides*. When present, it helps to define the gastric region of the carapace: its anterior loop is probably represented on the Brachyurous carapace by a groove that is sometimes found marking off a suborbital areola.

Certain grooves or depressions are commonly noticeable which map out the surface of the carapace into regions. The regions form three dorsal series—a median and two lateral.

The median series includes the *frontal region*, which lies between the orbits; the *gastric region*, which occupies the greater part of the middle of the carapace behind the front and coincides in a general way with the boundaries of the stomach; the *cardiac region*, a small area which lies in the middle line immediately behind the gastric region and indicates the position of the heart; and the *intestinal region*, which follows the cardiac and overlies the intestine just where it curves over the endosternal apodemes to enter the abdomen.

The lateral series include, on either side, the *hepatic region*, which occupies the antero-lateral corner of the carapace behind the orbits; and the *branchial region* which takes up all the wing of the carapace outside the gastro-cardiac region and behind the hepatic region.

On the sidewalls of the carapace the triangular space on either side of the buccal cavern is known as the *pterygostomian region*, between which and the hepatic region lies the *subhepatic region*.

Any or all of the dorsal regions of the carapace may be further divided symmetrically into areolæ. The gastric region is fairly constantly subdivided into three areolæ—one of which is postero-median, the others being antero-lateral. Again a narrow space fringing the upper margin of the orbit is sometimes separated as the *orbital region*, while the space between the lower margin of the orbit and the pterygostomian region is sometimes wide enough to be distinguished as a *suborbital region*.

Mention must here be made of the *lineæ anomuricæ*, which though characteristic of the sub-order of *Anomura* (*Anomala*) are also found among the *Brachyura* of the Homolidean families. They are the homologues of the epimeral sutures of the Brachyuran carapace, but they are found high up on the sidewalls of the carapace or even on the dorsum itself.

7. *Of the General Bionomy of the Brachyura.*

The majority of crabs are marine, but some live in brackish water, others

entirely in fresh water, while a considerable number are amphibious, and not a few live entirely on land, only visiting the sea periodically.

The *marine crabs* are found everywhere, but are most numerous in warm seas. Most of them are inhabitants of the littoral and shallow water, but the moderate depths up to 50 fathoms are also rich in species. A fair number of species are found in 50–100 fathoms, while the depths between 100 and 500 fathoms are by no means poor in crabs. Below 1000 fathoms, however, crabs are not met with in abundance, although a species of *Ethusa* was dredged by the "Challenger" at the enormous depth of 1875 fathoms. In these seas the greatest depth at which a crab (*Ethusa investigatoris*) has been found is 1300 fathoms.

The habits of the littoral and shallow-water species are extremely variable. Many species shelter in the rocks and reefs, and some burrow in sand and shingle and mud. Many sluggish and inoffensive species are curiously coloured and sculptured so as to resemble the broken shells and bits of eroded and incrusted coral-rock among which they live, while other such species actually deck themselves with a patchwork of pieces of seaweed and fragments of shell so as to escape notice. Numerous small species pass their lives esconced among the branches of living zoophyte-colonies, or among the spines of Echinoderms, and are coloured exactly like their hosts. Many *Dromiidæ* carry about a house of their own, in the form of a sponge which fits tightly over their carapace; while other species of this family, and of the *Dorippidæ*, roof themselves over with the dead valve of a Lamellibranch shell, upon which it is common to find a sea-anemone growing. Other small species (notably among the *Pinnoteridæ*) live as commensals in the mantle-chamber of living bivalve mollusks, or in the cloaca of Holothurians, or in the tubes of Annelids, or in the atrial cavity of Ascidians. Some bold and active species, such as the *Grapsi*, expose themselves fearlessly on the rocks between tide-marks, trusting to their speed and craft to escape their enemies; while other active species, such as the *Portunidæ* and *Matutidæ*, have their legs modified to form paddles by means of which they swim with much ease and speed. A few species (*Plagusia*, *Planes*, *Varuna*) make their home on drift timber, drift seaweed, hulls of ships, etc., and so may be regarded as belonging to the oceanic fauna.

The majority of *freshwater crabs* belong to the Cyclometope family of *Telphusidæ*, although there are numerous Catometopes that also live in fresh-water. During the hot and dry season some of these are accustomed to aestivate, burrowing deep into the moister layers of the soil.

The *amphibious crabs* are for the most part Catometopes. They are generally gregarious and live close to the seashore, or among estuarine swamps, in burrows. They obtain their food along shore, and can breathe air so long as their gill-chambers are kept moist. Although their burrows are usually flooded

at high tide, this is by no means always the case. Some of the most intelligent of all the crabs are of amphibious habit.

Most of the *land-crabs* also belong to the *Catometopa*, though a few species of *Telphusidæ* are terrene. They prefer damp jungle, where they either burrow in the earth or crouch under roots and fallen timber. Though their gills are well developed, they also in part respire by means of the thickened lining-membrane of their greatly-enlarged branchial chambers; but it is essential that the air should be moist. Though they are typical inhabitants of the moist jungles of the islands and seaboard, yet they are also found at elevations of several thousand feet in places where the rainfall is heavy.

Of the *deep-sea crabs*, those that live at moderate depths, to which it is possible that a certain amount of light penetrates, very often have the eyes enlarged; while those that live in the unilluminated abysses very commonly have the eyes small and deficient in pigment.

Although no existing members of the Arthropod phylum exceed the largest Brachyura in size, yet the size of the body in this suborder is extremely variable. At the one extreme we find *Collodes malabaricus*, an inhabitant of these seas, of which the carapace, in an adult and egg-laden female, is less than one-sixth of an inch in its greatest diameter, and *Ebalia diadumena*, another inhabitant of these seas, the greatest diameter of the carapace of an egg-laden female of which is less than one-fifth of an inch: at the other extreme we have the Australian *Pseudocarcinus gigas* whose carapace is said to reach a breadth of about two feet, and the Japanese *Kaempferia* (*Macrochira*) *Kaempferi* the span of whose chelipeds attains to ten feet.

The Brachyura as a whole are the most highly organized and most intelligent of the Crustacean class. The Cyclometopes and Catometopes are particularly alert and active, and among several of the gregarious species of amphibious Catometopes life appears to be almost as complex as it is among many insects.

Although parental care does not go beyond the simple and almost mechanical stage of carrying the eggs until they are hatched, yet in some Brachyura the sexual feelings are sufficiently sustained and complex to give rise to well marked "secondary" differences between the sexes and between the adults and immature young of the male sex.

If the males are not larger than the females, yet, at any rate, it is very common to find the male having one or both of its chelipeds very much larger than those of the female, the difference in size being usually most marked in the chelæ. We know that in some cases the males use their enlarged chelipeds for fighting with each other. On the other hand, it must be remembered that there are many species of crabs in which the chelipeds show no sexual differences whatever.

Differences in colour between the sexes have also been noticed, though they do not appear to be of common occurrence. In the *Gelasimi* one cheliped of the adult male is not only enormously enlarged, but its chelæ are also brilliantly coloured. In one species of this genus the brightly coloured chelæ are obtrusively displayed by rival males, apparently to attract the female. And in more than one species of the same genus the carapace of the adult male is known to be more brilliantly coloured than that of the female, at any rate under the influence of sexual rivalry and excitement.

Several Brachyura (*e.g.*, species of *Matuta*, *Ocypoda* and *Metaplax*) possess organs for the production of sound. These organs consist of two opposable file-like ridges, the vibrations of which, when they are rhythmically rubbed against one another, give rise to grating and whirring sounds of considerable power. The more perfect of the two ridges is placed on some part of the flexor aspect of the cheliped; the opposed ridge may either be placed on another part of the cheliped or below the orbit.

In *Matuta* and *Ocypoda* both sexes possess these organs and have been observed to use them when moved by fear or anger. In *Metaplax* the male alone has them, so that in this case they are probably used to express sexual emotions.

As regards the part they play in Nature, the crabs, in common with other Crustacea, are generally regarded as scavengers. They are more particularly the scavengers of the sea-shore, and in tropical islands land- and strand-crabs are of much importance as land-scavengers also.

On the other hand the marine species are one of the principal sources of food of numerous fishes, especially of Rays, and remains of small crabs have been found in the stomach of starfish. Among the chief depredators of the shore and freshwater and amphibious species in this country may be mentioned water-lizards (*Varanus*) and crocodiles and occasionally frogs, swimming- and wading-birds of all kinds, kites and crows, jackals and other small carnivorous mammals and sometimes pigs and monkeys.

[On the general bionomy of Malacostraca see Ortmann, in Bronn's Thier-Reich, Malacostraca, pp. 1181–1262].

II. General Classification of the Brachyura.

Class **CRUSTACEA**.

Order MALACOSTRACA.

Suborder Brachyura, Leach, Boas, Stebbing.

Cancri Brachyuri, Linnæus, Systema Naturæ, ed. xii. tom. I. pars ii. p. 1038 (1767).
Kleistagnatha (part), Fabricius, Entomologiæ Systematicæ Supplementum, p. 307 (1798).
Cancri Brachyuri (part), Lamarck, Syst. des Animaux sans vertèbres, p. 148 (1801).

Brachyuri, Latreille, Hist. Nat. des Crustacés et des Insectes, Vol. V, p. 347 (1803): Genera Crustaceorum et Insectorum, Vol. I, p. 25 (1806): Fam. Nat. du Règne Animal, p. 267 (1825)—exc. *Lithodes*.

Brachyura, Leach, Transactions of the Linnean Society, Vol. XI, 1815, p. 307.

Brachyures, Desmarest, Considérations Générales sur la Classe des Crustacés, p. 84 (1825)—exc. *Lithodes*.

Brachyures, Milne Edwards, Hist. Nat. des Crustacés, Vol. I, p. 247 (1834), plus *Anomoures Apterures*, Vol. II, p. 168.

Brachyura, Macleay, Illustrations of the Annulosa of S. Africa, p. 54 (1838).

Brachygnatha et *Brachyura Oxystomata*, De Haan, Crustacea in Siebold's Fauna Japonica (1850).

Brachyura, Dana, United States Exploring Expedition, Vol. XIII. Crustacea, Part I, p. 58 (1852), plus *Anomoura Superiora*, p. 400.

Brachyura, Heller, Crustaceen des südlichen Europa, p. 17 (1863), plus *Anomura Apterura*, p. 143.

Brachyura, Miers, Catalogue of the Crustacea of New Zealand, p. 1 (1876): Report on the Challenger Brachyura 1886 p. 1: [plus *Anomura Dromidea* et *Raninidea*, Henderson, Report on the Challenger Anomura, 1888].

Carcinomorpha: Huxley, Proc. Zool. Soc., 1878, p. 785.

Brachyura, Claus, Grundzüge der Zoologie, 4th ed., Vol. I, p. 632 (1880)—exc. *Porcellanidæ* et *Lithodidæ*.

Brachyura, Boas, Studier over Decapodernes Slægtskabsforhold (Vidensk. Selsk. Skr., 6 Række, naturvidenskabelig og mathematisk Afd. I. 2) Kjobenhavn 1880, pp. 159, 200.

Brachyura, Haswell, Catalogue of the Australian Crustacea, p. 1 (1882): plus *Anomoura superiora*, p. 138.

Brachyura, Stebbing, A History of Crustacea, p. 51 (1893).

Dromiidea, *Oxystomata* and *Brachyura*, Ortmann, Malacostraca, pp. 1153, 1156, 1163, in Bronn, Klassen und Ordnungen des Thier-Reichs, Bd. V, new series.

Carapace with a well defined lateral border to the greater part of its dorsal surface, and with an epimeral suture (or its homologue, a *linea anomurica*) on either side.

"Front" always in contact with the epistome, and often broad.

Abdomen much smaller than the cephalothorax, beneath which it is folded: the abdominal pleura, when distinguishable, are in the same plane and in the same straight line with the abdominal terga.

Thoracic sternum usually broad, the last segment never independently movable: usually channelled in the middle line for the lodgment of the male abdomen.

The eyes in repose are commonly carried at right angles to the longitudinal axis of the body, and are often lodged in orbits.

The antennules are always separated from one another by a septum derived from the "front:" their basal joint is swollen and enlarged, their flagella are extremely short, and they are commonly retractile into fossæ beneath the front.

The antennal peduncle consists of 4 joints, but the first joint is often reduced in size, cramped up, and concealed: there is never a movable antennal scale, and the antennal flagellum is usually shorter than the carapace.

All the mouth-parts lie in a well defined fold of the carapace or buccal cavern. The mandibles consist of a strongly calcified protopodite, the free end of which forms a triangular trenchant incisor process, and of a three-jointed incurved palp.

The coxa and basis of the 1st and 2nd maxillæ are well developed, those of the 2nd maxillæ being deeply cleft. The endopodite (palp) of the 1st maxillæ usually curves obliquely outwards. The scaphognathite is a very broad plate.

The flagella, when present, of the exopodites of the maxillipeds are almost always bent inwards nearly at a right angle, and the epipodites of the maxillipeds are almost always very large.

In a great majority of crabs the ischium and merus of the external maxillipeds are broad plates, which completely close the buccal cavern like doors and conceal the other mouth-parts.

The thoracic legs are six-jointed, their basipodite and ischium being fused to form a single piece. None of these legs have exopodites, and it is only in one small primitive group that any of them carry epipodites or podobranchiæ. The 1st pair, which are often enlarged, are chelate; the 2nd and 3rd pairs are monodactylous; the 4th and 5th pairs may either be monodactylous, or sometimes one or both of them may be subchelate and reduced in size.

In the male, modified uniramous appendages are present on the 1st two abdominal somites. In the female biramous setose appendages are present on the 2nd–5th abdominal somites. In the *Dromides* alone a pair of small uniramous appendages are also present on the 1st abdominal somite, and in the *Dromiidea* alone a pair of plates intercalated between the 6th and 7th abdominal somites are the modified homologues of appendages of the 6th somite.

The ducts of the male reproductive organs open either on the coxopodites of the last pair of thoracic legs, or, less commonly, on the corresponding segment of the sternum itself. The oviducts almost always open on the sternal segment corresponding with the antepenultimate pair of thoracic legs, rarely upon the coxæ of these legs themselves.

The gills are almost always phyllobranchiæ: in the *Dromiidea* alone they may sometimes be trichobranchiæ, or of an intermediate character.

Five main sections of the Brachyura are generally recognized, as is shown in the following table:—

I. The efferent branchial channels run along the middle line of the endostome, so that the buccal cavern or, at any rate, that part of it which corresponds with the endopodites of the external maxillipeds, is elongate-triangular, its apex traversing or invading the extremely narrow epistome. The 1st abdominal somite of the female is without appendages. No appendages of any sort to the 6th abdominal somite — Oxystoma.

II. The efferent branchial channels run along either side of the endostome, so that the buccal cavern is more or less quadrangular, never acutely triangular:—

1. The 1st or true basal joint of the antennal peduncle is a large, exposed, and generally a freely-movable joint. Either *lineæ anomuricæ* are present on the carapace, or the appendages of the 6th abdominal somite are present as a pair of plates intercalated between the 6th and 7th somites. The 1st abdominal somite of the female carries a pair of slender uniramous appendages. The oviducts open on the coxo-

podites of the antepenultimate pair of legs. No median apodeme ... ... DROMIDES.

2. The 1st or true basal joint of the antennal peduncle is small and almost immovably embedded. *Lineæ anomuricæ* are not present, nor are there any sort of representatives of appendages on the 6th abdominal somite. No appendages on the 1st abdominal somite of the female. The oviducts open on the sternum. A median apodeme is present [BRACHYURA VERA]:—

i. The vasa efferentia of the male pierce the coxopodites of the last pair of thoracic legs:—

α. Carapace narrowed anteriorly, the front produced to form a distinct rostrum which may be pointed or deeply bifid or trifid: epistome usually long fore-and-aft ... ... OXYRHYNCHA.

β. The front is truncated and never forms a rostrum: epistome short fore-and-aft ... CYCLOMETOPA.

ii. The vasa efferentia of the male open either on the last segment of the thoracic sternum, or if they perforate the coxopodites of the last pair of thoracic legs, then they pass obliquely forwards in a special groove in the sternum ... ... CATOMETOPA.

DROMIDES or DROMIACEA.

(*Dromiacea*, De Haan).

Apterures et *Homoliens* (partim), Milne Edwards, Hist. Nat. Crust. II. 168, 180.

Dromiacea, De Haan, Faun. Japon. Crust., p. 102.

Dromidia vel *Anomoura Maiidica Superiora*, Dana, U. S. Expl. Exp., Crust. pt. I, p. 400.

Apterura, Heller, Crust. Südl. Europ., p. 143.

Anomoura Dromidea, Miers, Cat. Crust. New Zealand, p. 57.

Dromiacea, Boas, Recherches sur les affinités des Crustacés Décapodes (Vid. Selsk. Skr., 6 Raekke, nat. og matb. Afd. I. 2, 1880, p. 202).

Anomoura Dromidea, Haswell, Cat. Austral. Crust., p. 138.

Anomura Dromidea, Henderson, Challenger Reports, Zoology, Vol. XXVII., p. 2.

Dromiacés, Bouvier, Bull. Soc. Philomath. de Paris, (8) VIII. 1896, pp. 34–108.

Dromiinea, Stebbing, Hist. Crust., p. 133.

Dromiidea, Ortmann in Bronn's Thier-Reich, Malacostraca, p. 1153.

Dromiacea vel *Brachyura Primigenia*, Alcock, Journ. Asiatic Soc. Bengal, Vol. LXVIII. pt., 2, 1899, p. 124.

Dromiaceæ, Milne Edwards et Bouvier, Crust. Décap. de l'Hirondelle (suppl.) et de la Princesse Alice, Monaco, 1899, p. 8, and Exp. Sci. du Travailleur et du Talisman, Crust. Décapod. pt. 1, p. 5.

Carapace seldom broader than long, often—as also the appendages—pilose. Front narrow.

Either orbits and antennular pits are wanting, or there are common orbito-antennular pits into which both the eyes and the antennules are retractile.

The antennal peduncle consists of four separate and freely-movable joints, in the basal one of which the renal tubercle is prominent and conspicuous: the antennal flagellum is comparatively long.

The epistome is triangular or truncate-triangular, and is well delimited from the palate.

The buccal cavern is quadrilateral, but is usually broader in front than behind. The external maxillipeds may be pediform, or sub-pediform, or completely opercular.

The last pair of legs are dorsal in position, and, with few exceptions, are prehensile slender and reduced in size, or even sometimes rudimentary. The penultimate pair sometimes resemble the last pair.

The abdomen in both sexes is large, and usually consists of seven separate segments: in the male it has the usual anterior two pairs of modified copulatory appendages, behind which, very occasionally, are 3 other pairs of rudimentary appendages: in the female it has the usual four pairs of ovigerous appendages and, in addition, a pair of smaller uniramous appendages situated on the first segment.

The oviducts perforate the coxopodites of the antepenultimate pair of legs, and the seminal ducts perforate the coxopodites of the last pair of legs.

The gills are usually phyllobranchiæ, but may be trichobranchiæ or may be intermediate in character: they vary in number from 20 to 8 on either side.

All the Dromides are marine and many of them are found only in deep water.

I have proposed to divide the *Dromiacea* into two tribal groups, namely :—

I. Dromiidea, in which the carapace has no *lineæ anomuricæ*, the eyes and antennules are almost always retractile into orbito-antennular pits, the 6th pair of abdominal appendages are commonly represented by a pair of small plates intercalated between the 6th and 7th abdominal somites, and the sternum of the female is traversed in more or less of its extent by two obliquely-longitudinal grooves.

II. Homolidea, in which *lineæ anomuricæ* are usually present, the eyes and antennules are not retractile into cavities, the 6th pair of abdominal appendages are not in any way represented, and the sternum of the female is not traversed by any special grooves.

I. Dromiidea, Alcock.

Dromiens, Milne Edwards, Hist. Nat. Crust. II. 168.

Dromidæ, Henderson, Challenger Anomura, p. 2.

Dromidæ et *Dynomenidæ*, Ortmann in Bronn's Thier-Reich, Malacostraca, p. 1155.

Dromiinæ et *Dynomeninæ*, A. Milne Edwards & E. L. Bouvier, Crust. Décap. Hirondelle et Princesse Alice Monaco, 1899, p. 9.

Dromidæ, Alcock, Journ. Asiatic Soc. Bengal, Vol. LXVIII, pt. 2, 1899, p. 125.

Carapace sometimes longer than broad, often broader than long, without *lineæ anomuricæ*.

Eyes and antennules almost always (*Homolodromia* is the only exception) retractile into common orbito-antennulary pits, the lower wall of which is formed about equally (1) by the basal joint of the antennule itself, (2) by the basal joint of the antenna, and (3) by a sub-orbital spine or dentiform lobe.

These orbito-antennulary pits very often show traces of a sub-division into two fossæ, one for the antennule the other for the eye—the boundary between the two fossæ often being a tooth or a sort of fold in the upper margin of the "orbit."

Eye of the ordinary form, situated at the end of a short stout eye-stalk, the basal joint of the eye-stalk being inconspicuous.

Epistome triangular, its apex in close contact with the deflexed tip of the front. Vault of the palate of good depth.

External maxillipeds usually opercular, sometimes subpediform.

Fingers of the chelipeds generally short, stout, channelled along their opposed surfaces, and strongly calcified in their distal half.

Sternum of the female traversed longitudinally, in part or in almost all of its extent, by a pair of special grooves that sometimes end in special tubercles.

The abdomen of both sexes consists of seven separate segments. Very often a pair of small lateral plates—the rudiments of the 6th pair of abdominal appendages—is intercalated between the 6th and 7th somites.

The gill-plumes vary in number from 20 to 14 on either side, and are either trichobranchiæ or phyllobranchiæ.

Many of the species are protected by a commensal Sponge or Ascidian, or by an empty valve of a Lamellibranch shell, carried over the back.

The Dromiidea are divided into three subfamilies which are distinguished as follows:—

Synopsis of the families of Dromiidea.

I. The last two pairs of legs are reduced in size, subdorsal, and prehensile:—

1. Lateral borders of carapace ill defined. The appendages of the 6th abdominal somite are not in any way represented. Epipodites are present on the chelipeds and next two pairs of legs. Gill-plumes 19 or 20 on either side, trichobranchiæ — HOMOLODROMIDÆ.

2. Lateral borders of carapace well defined. The appendages of the 6th abdominal somite are represented by a pair of plates intercalated between that somite and the telson. Epipodites may be present on the chelipeds, but not on any of the legs. Gill-plumes 14 or 16 on either side, phyllobranchiæ ... ... — DROMIDÆ.

II. Only the last pair of legs reduced in size and subdorsal. Lateral borders of carapace well defined. The appendages of the 6th abdominal somite are represented as in the *Dromidæ*. Epipodites are present on the chelipeds and next two pairs of legs. According to A. Milne Edwards and Bouvier the gill-plumes are 20 on either side ... ... DYNOMENIDÆ.

Of the nineteen or twenty known species of Indian *Dromiidea* only ten or eleven are likely to fall in the way of ordinary collectors, the other eight being known only from considerable depths.

Family HOMOLODROMIDÆ, Alcock.

Alcock, Journ. Asiatic Soc. Bengal, Vol. LXVIII, pt. 2, 1899, p. 127.

Carapace longer than broad, convex in both directions, the lateral borders hardly defined.

Front cut into two prominent teeth, between which, but on a much lower plane, a third small tooth is *sometimes* present.

Antennal flagella longer than the carapace.

External maxillipeds opercular but with a pediform cast.

Chelipeds equal, slender, though stouter than the legs.

First two pair of legs much longer than the chelipeds: last two pair much shorter than the first two pair, subdorsal, prehensile or chelate.

The abdomen in both sexes consists of 7 separate segments: there are no lateral platelets intercalated between the 6th and 7th segments.

The gills are trichobranchiæ, or are intermediate between trichobranchiæ and phyllobranchiæ: the gill-plumes are very numerous—there may be as many as 20 on either side.

Foliaceous epipodites are present on the chelipeds and next two pairs of legs.

The sternal grooves of the female are short, ending at the level of the genital openings.

This family contains one Indian genus, *Arachnodromia*, which differs from the other two known genera of the family as follows: from *Homolodromia* A. M. Edw. in having the eyes and antennules retractile into orbito-antennular cavities, and from *Dicranodromia* A. M. Edw. in having a small arthrobranch above the 2nd maxillipeds.

All the members of the family belong to the Deep-sea fauna.

Arachnodromia, Alcock.

Arachnodromia, Alcock, Investigator Deep Sea Brachyura, p. 17, and Journ. Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 130.

Carapace elongate-oblong but somewhat broader behind than in front, deep, inflated, tomentose, its texture thin but well calcified: two creases break either lateral border, the posterior one being the more distinct and being continued to the cardiac region (=branchial groove), the anterior one, or true cervical groove, not proceeding far on to the dorsum of the carapace. The front is horizontal, prominent, and deeply bifid.

The antennule and eye of either side are completely retractile into a common deep fossa (just as in *Dromia*) which affords them complete protection. As in *Dromia*, the floor of this common antennular-orbital fossa is formed by a subocular ("antennal") tooth in contact with the basal joint of the antenna, and, as in *Dromia*, the outer wall of the orbit is breached by a wide gap. The orbital portion of the fossa, which is loosely filled by the eyes, has the hollow for the eyes much deeper than the hollow for the eyestalk. The eyestalks are slender, the eyes small but perfectly formed and well pigmented.

The two basal joints of the antennæ, which are quite freely movable, largely fill the gap in the lower wall of the orbit, and lie in the same plane with the antennules; the second joint has its antero-external angle produced to form a coarsish spine: the antennal flagella are longer than the carapace.

The palate is particularly well demarcated from the epistome and is rather broader in front than behind: the ridges that define the expiratory canals are very distinct. The epistome is in the closest possible contact with the front, but without complete fusion. The external maxillipeds are distinctly operculiform, but owing to the moderate expansion of the merus and to the coarseness of the palp, they have a slight pediform cast: they close the buccal cavern, but not so tightly as in *Dromia*.

The chelipeds are equal and are rather slender, though considerably stouter than the legs: the fingers are well calcified and are hollowed *en cuillère*, the tip of the dactylus shuts into a notch in the tip of the opposed finger.

The legs are cylindrical: the first two pairs are very long, the last two are short, subdorsal in position, and cheliform rather than subcheliform.

The sternal grooves of the female end opposite the openings of the oviducts, without tubercles.

The abdomen of both sexes consists of seven distinct segments. In both sexes the pleura of the 3rd–6th abdominal somites are remarkably free and independent (*i.e.*, not in contact with those in front and behind) and the last abdominal tergum is nearly as long as the preceding five combined.

The branchial formula is as follows:—

Somites and their appendages.	Podobranchiæ.		Arthrobranchiæ.		Pleurobranchiæ.		
VII	ep.		0		0	=	ep.
VIII	1+ep.		1		0	=	2+ep.
IX	1+ep.		2		0	=	3+ep.
X	1+ep.		2		0	=	3+ep.
XI	1+ep.		2		1	=	4+ep.
XII	1+ep.		2		1	=	4+ep.
XIII	0		2		1	=	3
XIV	0		0		1	=	1
Total	5+6 ep.	+	11	+	4	=	20+6 ep.

Arachnodromia Baffini, Alcock and Anderson. Plate I., figs. 1, 1*a-c*.

Arachnodromia Baffini, Alcock and Anderson, Ann. Mag. Nat. Hist., Jan. 1899, p. 7.
For references see Alcock, J. A. S. B., Vol. LXVIII., pt. 2, 1899, p. 132.

Body and appendages tomentose.

Carapace deep—nearly as deep as broad—convex, from a fourth to a fifth longer than broad, its greatest breadth being just in front of its posterior border: except for a few sharp granules antero-laterally and along the ill-defined lateral borders it is smooth, and the regions are hardly indicated. The front is deeply cleft to its base, into two acutely triangular teeth.

Upper margin of orbit notched near its outer angle which is dentiform, the outer angle of the lower margin of the orbit is much more strongly dentiform, and the (outer) orbital wall between the two spines is deficient.

Antennal flagella longer than the carapace. The antennal and antennular peduncles both surpass the tip of the front by their terminal joint.

Chelipeds rather slender, unarmed except for a few granules seen on denudation, about $1\frac{2}{3}$ times the length of the carapace: fingers strongly hollowed '*en cuillère*,' especially the fixed one, which alone has teeth: wrist not elongate, about as long as the dactylus and a little shorter than the palm.

First two pairs of legs more than twice the length of the carapace: their dactyli are about two-thirds the length of the preceding joint, are stout, are sharply spinate along the posterior edge, and end in a claw. The last two pairs of legs are about the same length as the carapace: their small claw-like dactyli shut down on a ring of spines at the end of the preceding joint.

Colours in spirit: dirty white, with a bluish tinge on the carapace and a faint reddish tinge elsewhere; eyes chocolate.

In the largest specimen, which is a female, the carapace is 30 millim. long and 24 millim. broad, and the extended abdomen is 35 millim. long.

$\frac{2371-2373}{10}$. Types of the species { Off the Travancore coast, Lat. 7° 17′ 30″ N. Long. 76° 54′ 30″ E. } 430 fathoms. "Investigator."

$\frac{9924}{6}$. Bay of Bengal, off W. coast of Andamans. 238–290 fathoms. "Investigator."

Named after the famous navigator William Baffin, who though best known as an explorer of Arctic Seas, was, like his brilliant contemporary John Davis, connected with the early history of our Indian empire. Both Davis and Baffin lost their lives in Indian waters, Davis being treacherously murdered by Malay Pirates, Baffin being killed in action against the Portuguese at the entrance to the Persian Gulf. "In the Indies he dyed, in the late Ormus businesse, slaine in fight with a shot."

Family Dynomenidæ, Ortmann.

Dynomenidæ, Ortmann, in Bronn's Thier Reich, Malacostraca, p. 1155: Alcock, J. A. S. B., Vol. LXVIII., pt. 2, 1899, p. 127.

Dynomeninæ, A. Milne Edwards and E. Bouvier, Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 9.

Carapace either longer than broad and convex, or broader than long and flattish, the lateral borders well defined.

Front broadly triangular, sometimes notched at tip. Antennal flagella not so long as the carapace.

External maxillipeds typically opercular, completely closing the buccal cavern.

Chelipeds equal or slightly unequal, generally much stouter than the legs.

First three pair of legs stout, about as long as the chelipeds. Fourth (last) pair of legs dorsal and rudimentary.

The abdomen in both sexes consists of 7 segments, and there is a pair of lateral platelets intercalated between the last two segments.

The gills are phyllobranchiæ but sometimes show the transition from tricho- to phyllobranchiæ. The branchial formula is said by A. Milne Edwards and Bouvier (Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 10), to be the same as that of *Homarus vulgaris*.

The sternal grooves of the female end at the level of the genital openings.

This family contains two genera, both of which are represented in the Indian fauna.

Key to the genera of Dynomenidæ.

I. Carapace flattish, broader than long, pilose ... ... Dynomene.
II. Carapace convex, longer than broad, spinose ... ... Acanthodromia.

Dynomene, Latreille.

Dynomene, Latreille in Cuvier's Règne An. (nouv. ed., 1829), p. 69: Desmarest (29), Milne Edwards (73), Lamarck (54), De Haan (23), Dana (21), A. Milne Edwards (73), Ortmann (84).

Milne Edwards and Bouvier, Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 10.

For references see J. A. S. B., LXVIII., pt. 2, 1899, p. 133.

All parts usually tomentose.

Carapace subcircular or polygonal, flattish, slightly broader than long.

Front broadly triangular, dorsally grooved, more or less distinctly notched or divided at tip.

Palate well delimited from epistome: efferent branchial channels well defined.

The chelipeds usually do not differ greatly in size from the first 3 pair of legs: these are stout and of about equal length.

The 4th (last) pair of legs are quite rudimentary and alone are dorsal in position.

The branchial formula, according to Milne Edwards and Bouvier, is the same as that of *Homarus vulgaris*.

In the male (though not in the case of any known Indian species) in addition to the usual appendages of the first two abdominal somites, rudimentary appendages may be present on the next 3 somites.

Distribution: Indo-Pacific, from Mauritius and Madagascar to California: Tropical Atlantic in the neighbourhood of C. Verde Is. Occasionally descending to depths of about 140 fathoms.

Dynomene pilumnoides, Alcock. Plate I., fig. 2.

Dynomene pilumnoides, Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 133.

Body and appendages covered with a thick coat of stiff club-shaped hairs.

Carapace subcircular, flattish, the regions ill defined: a few inconspicuous symmetrically disposed lumps on the gastric and anterior part of the branchial regions.

Front broadly-triangular, deeply grooved in the middle line. Upper border of orbit oblique, smooth, notched near the middle; lower border smooth, notched at the inner angle as in *D. ursula*.

Lateral borders of carapace cut into 5 spiniform teeth, the last of which is the smallest.

Chelipeds in the male a little unequal, the larger one about $1\frac{1}{3}$ times as long as the carapace and about a dactylus longer than the longest legs: except for a few denticles along the outer edge of the wrist they are, when denuded,

smooth: the inner angle of the wrist is produced, and the fingers, which are arched and spooned at tip, are shorter than the palm.

When the legs are denuded they are smooth except for some coarse and inconspicuous serrations of the anterior border of the merus and carpus and for a series of small teeth along the posterior border of the stout dactylus.

The last pair of legs are slender rudiments.

There are no vestiges of any appendages on the 3rd–5th abdominal somites of the male.

In the single specimen the carapace is 10 millim. long and a little over 11 millim. in greatest breadth.

$\frac{9000}{6}$. (Type of the species). Off Kiltán I., Laccadives. 50–30 fathoms. "Investigator."

Differs from *D. hispida* in the form of the carapace, the outline of which is nearly a circle; in the non-serrated orbital edges, and the non-spinulose chelipeds and legs: from *D. prædator* in having the antero-lateral borders of the carapace cut into 5 spiniform teeth, and the wrist of the chelipeds of normal form: from *D. ursula* in having the pterygostomian regions smooth and the legs and chelipeds non-spinulose: from *D. filholi* in having no rudimentary appendages on the 3rd–5th abdominal somites of the male: and from *D. pugnatrix* in having the carapace almost circular, the lower edge of the orbit non-serrated, the legs non-spinose, and the chelipeds of normal form.

Acanthodromia, A. Milne Edwards.

Acanthodromia, A. Milne Edwards, Bull. Mus. Comp. Zool., 1880, p. 31: E. L. Bouvier (12), Ortmann (84), Alcock (3).

For references see Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 134.

Differs from *Dynomene* in having the carapace longer than broad, convex, and closely covered with spines instead of hairs.

Distribution: Caribbean Sea and Andaman Sea, in depths of 75 to 150 fathoms.

Acanthodromia margarita, Alcock. Plate I., figs. 3, 3*a*.

Dynomene margarita, Alcock, Investigator Deep-Sea Brachyura, p. 19, pl. ii., fig. 3.

The whole carapace and dorsal surfaces of the chelipeds and legs are as closely as possible covered with spines and spinules: the under surfaces of the body and legs, the eye-stalks, antennæ, and external maxillipeds are closely and crisply granular.

On the middle of the fourth abdominal tergum is a pair of large smooth tubercles, exactly like pearls, in the closest contact with one another.

Carapace sub-cylindrical, longer than broad; the regions hardly indicated, though the branchial groove is fairly plain.

Front triangular, deflexed, dorsally concave; its apex is in close contact with that of the epistome, and is surmounted by a horizontal spine similar to the larger spines of the surface of the carapace. Supraorbital borders tumid.

Antennal flagellum nearly as long as the carapace.

Chelipeds equal, a little longer and stouter than the first three pair of legs, and not much longer than the carapace. The fingers are short and stout, and meet throughout their extent.

The last pair of legs are slender rudiments, hardly longer than the basal joints of the other legs.

Colours in spirit, milk-white; eyes deeply pigmented.

In the single small male the length of the carapace is 5 millim., the greatest breadth a little over 4 millim.

$\frac{2690}{10}$. (Type of the species). { Andaman Sea. Lat. 13° 16′ N. Long. 93° 8′ E. }. 75 fathoms. "Investigator."

Family Dromiidæ s.l.

Dromidæ (partim), Dana, U. S. Expl. Exp. Crust, pt. ii., p. 1428: Henderson, Challenger Anomura, p. 2: Ortmann in Bronn's Thier Reich, Malacostraca, p. 1154.

Dromiinæ (partim), Milne Edwards and Bouvier, Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899 p. 9.

Dromiidæ, Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 128.

Carapace variable, sometimes as long as or even a little longer than broad, sometimes slightly broader than long; generally strongly convex in both directions, sometimes flat; commonly ovoid or subcircular, occasionally pentagonal: the lateral borders well defined in most of their extent.

Front usually cut into 3 teeth, the middle one of which is always on a much lower plane than the others and is often of insignificant size or even absent: the front is rarely triangular, without lateral teeth. Antennal flagella shorter than the carapace.

External maxillipeds typically opercular, completely closing the buccal cavern.

Chelipeds equal, generally much stouter than the legs.

First two pair of legs generally stout, not much shorter than the chelipeds.

Last two pair of legs, subdorsal and prehensile, generally much reduced in length and slender. There is a tendency for the fourth (last) pair to be a little longer than the third pair, and occasionally the fourth pair are as long as either of the first two pair.

The abdomen in both sexes consists of 7 segments, and there is a pair of lateral platelets intercalated between the last two segments.

The gills are phyllobranchiæ and are either 14 (or 16) in number on either side.

An epipodite of small size may be present on the chelipeds but not on any of the legs.

The sternal grooves of the female are variable: they may end at the level of the genital openings, or at the bases of the first pair of legs, or at the bases of the chelipeds.

This family is represented in the seas of India by six genera.

Key to the Indian Genera of Dromiidæ.

I. Front much as in *Dynomene*, broadly triangular, dorsally grooved, notched at tip. The sternal grooves of the female do not quite reach to the level of the genital openings on the antepenultimate pair of legs ... SPHÆRODROMIA.

II. Front usually cut into 3, sometimes into 2, teeth, rarely entire and triangular. The sternal grooves of the female reach the level of the bases of the 1st pair of true ambulatory legs:—

1. Third pair of ambulatory legs, though shorter, not less stout than the first two pair, ending in a huge talon-like dactylus: fourth (last) pair of legs short and very slender. Carapace flat and pentagonal ... ... CONCHOECETES.

2. Third pair of ambulatory legs similar to, though sometimes shorter than, the fourth (last) pair. Carapace usually convex:—

a. Legs smooth, the meropodites not specially dilated ... DROMIA.

b. Legs nodular, the meropodites not specially dilated ... CRYPTODROMIA.

c. Legs nodular; the meropodites of the chelipeds and first or first two pair of ambulatory legs dilated, petal-like ... ... PETALOMERA.

III. Front deeply cut into two broad lobes, each of which is broadly bifid: the divergent sternal tubercles of the female are at the level of the chelipeds ... ... LASIODROMIA.

SPHÆRODROMIA, Alcock.

Sphærodromia, Alcock, Investigator Deep-Sea Brachyura, p. 16, and J. A. S. B., LXVIII., pt. 2, 1899, p. 152.

All parts except the tips of the dactyli and fingers tomentose.

Carapace sub-globose. Front broadly triangular, grooved and notched in the middle line as in *Dynomene*.

Palate well delimited from the epistome: efferent branchial channels well defined.

Chelipeds longer and stouter than the first two pairs of ambulatory legs, which are not nodose. Last two pair of legs nearly similar to one another in length and thickness, which are much less than those of the first two pair.

In the male, in addition to the usual appendages of the first two abdominal somites, rudimentary appendages may be present on the next three somites.

The sternal grooves of the female are widely separated and inconspicuous and do not quite reach to the level of the genital pores, as in *Dynomene*.

Branchial formula not known.

Distribution: Bay of Bengal, Andaman Sea, 70 to 112 fathoms.

Key to the species of Sphærodromia.

I. The antero-lateral borders of the carapace run nearly up to the outer orbital angles ... ... *S. kendalli.*

II. The antero-lateral borders of the carapace run nearly up to the angles of the buccal cavern... ... ... *S. nux.*

Sphærodromia Kendalli, Alcock & Anderson. Plate IV., figs. 18, 18*a*.

Dromidia Kendalli, Alcock & Anderson, J. A. S. B., LXIII., pt. 2, 1894, p. 175: Illustrations of the Zoology of the Investigator, Crustacea, plate xxiv, figs. 1, 1*a*.

All parts covered with a thick, yellowish, velvet-like tomentum.

Carapace subcircular, globose, smooth when denuded, except for some scattered vesiculous granules on the pterygostomian regions and sidewalls; the cardiac region well defined and the "cervical" groove distinct: the antero-lateral borders, which are suberistiform and entire (except, perhaps, for a vesiculous granule or two) end at the orbital angle.

The front consists of two blunt triangular teeth. The upper border of the orbit is smooth and slightly notched near the middle: the lower wall of the orbit, outside the basal joints of the antennules and antennæ consists of a bluntly triangular tooth: the outer orbital angle is rounded off.

The external maxillipeds when closed leave a wide gap between their anterior border and that of the buccal cavern.

The chelipeds, which are about a dactylus length longer than the longest legs, are about $1\frac{1}{3}$ times the length of the carapace: vesiculous granules are present on all the edges of the arm, on the upper and outer surface of the wrist, and everywhere on the hands except the lower part of the inner surface: the wrist is a longish joint, not much shorter than the arm or palm, and has not its inner angle well defined.

The last two pairs of legs are about half the length of the other two: each ends in a small claw-like dactylus which is opposed to 2 or 3 tiny spinules at the end of the propodite.

Carapace of the unique specimen 18 millim. in either diameter.

$\frac{9332}{9}$. Type of the species. { Bay of Bengal. 112 fathoms / Lat. 14° 5′ 55″ Long. 80° 25′20″ }. "Investigator."

Named after Commander C. J. Kendall, R.I.M., sometime surveyor on board the Investigator.

Sphærodromia nux, Alcock. Plate IV., fig. 19.

Sphærodromia nux, Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 154.

Carapace globose, finely frosted with granules when denuded: the well defined lateral borders run down to the angles of the buccal cavern, and not to the orbits.

The tooth which forms the lower wall of the orbit is very broadly triangular and non-prominent.

When the external maxillipeds are closed there is a mere chink between their anterior border and that of the buccal cavern.

The edges of the arm and the outer surface of the wrist and hand are finely granular, the granules of the wrist and hand having a tendency to run in lines: the upper border of the wrist and palm are coarsely suberistiform.

In the male rudimentary appendages are present on the 3rd, 4th and 5th abdominal somites.

Carapace of the largest specimen nearly 10 millim. long and nearly 11 millim. in greatest breadth.

$\frac{3540}{10}$. Types of the species. Gulf of Martaban. 70 fathoms. "Investigator."

Conchœcetes, Stimpson.

Conchœcetes, Stimpson, Proc. Acad. Nat. Sci. Philad. 1858 (1859), p. 226: Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 150.

All parts, except the dactyli (which are more or less hairy) and the tips of the fingers, covered with a velvety tomentum.

Carapace flat, subpentagonal, non-elongate in the adult. Front cut into 3 teeth, of which the middle one is much smaller and is on a very much lower plane than the others.

Palate well delimited from the epistome. Efferent branchial channels well defined.

Chelipeds in the male much more massive and much longer than any of the legs.

The third pair of ambulatory legs though shorter are not less massive than

the first 2 pair, and end in a powerful talon-like dactylus. The fourth (last) pair of legs are short and slender.

The sternal grooves of the female do not meet; they end in scroll-like tubercles on the second segment of the sternum, between the bases of the 1st pair of ambulatory legs.

The branchial formula is as follows :—

Somites and their appendages.	Podobranchiæ.	Arthrobranchiæ. Anterior.	Arthrobranchiæ. Posterior.	Pleurobranchiæ.	
VII	ep.	0	0	0	= ep.
VIII	1+ep.	0	0	0	= 1+ep.
IX	ep.	1	1	0	= 2+ep.
X	ep.	1	1	0	= 2+ep.
XI	0	1	1 (small)	1	= 3
XII	0	1	1 (small)	1	= 3
XIII	0	1	0	1	= 2
XIV	0	0	0	1	= 1
Total	1+4 ep.	5	4	4	= 14+4 ep.

Distribution : Indo-Pacific from the Indus Delta on the west to Hongkong on the east and to the coasts of Queensland on the south, in shallow water usually.

Conchœcetes artificiosus, (Fabr.) Stimpson. Plate III., fig. 16.

Dromia artificiosa Fabricius, Ent. Syst. Suppl., p. 360, Bosc (11), Latreille (55).

Cancer artificiosus, Herbst (44). *Conchœcetes artificiosus*, Stimpson (99), Henderson (43), Alcock (3). *Dromia conchifera*, Haswell (37 & 38).

For references see Journ. Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 151.

Carapace pentagonal, with the posterior border of the pentagon curved, its dorsal surface quite flat, its greatest length (in the adult) about equal to its greatest breadth, its regions all well defined by grooves, the cervical and branchial furrows both equally well cut. There are sometimes a few granules near the borders of the carapace.

Front cut into 3 teeth with granular edges, the middle tooth being smaller and on a much lower plane than the others.

Upper border of orbit very oblique : a granular spine or tooth marks the true inner supra-orbital angle of higher Brachyura. Outer border of orbit apparently wanting, but on denudation it is found to be defined by a concave row of granules. Sub-orbital lobe granular and dentiform.

On the lateral borders of the carapace are usually two teeth, one immediately behind the cervical groove, the other immediately behind the branchial groove : one (the posterior) or both of these teeth may be nearly worn away, but usually they are both very distinct. Between the first spine and the orbital tooth is a

(sometimes broken) row of granules, and between the same spine and the outer angle of the buccal cavern is a row of granular tubercles: the surface of the subhepatic region between these two rows of granules may, when denuded, be granular or not.

The chelipeds of the adult male are, especially in the male, much more massive, compared with the legs, than is usual among the *Dromiidæ:* they are also much longer than any of the legs. The outer (exposed) surfaces of all the joints are more or less granular, some of the granules on the palm being very large and visible without denudation: in addition, the upper border of the arm is denticulate, there are 2 coarse tubercles at the far end of the outer surface of the wrist, and 2 on the palm just behind the finger-joint.

The first 3 pair of ambulatory legs are short, and some of their joints are granular and have a tendency to be nodular, a nodule on the carpus being very constant. Of these legs the 3rd pair ends in a characteristic stout talon-like dactylus the tip of which bends towards a stout lobe at the proximal end of the posterior border of the propodite.

The 4th (last) pair of legs are very slender: they reach to the far end of the carpus of the 3rd pair, and end in a tiny claw-like dactylus.

In both sexes the abdomen has a convexity along the middle line.

This species protects itself with the valve of a Lamellibranch shell, which is held, as in a frame, by the strong hook-like dactyli of the third pair of legs.

Distribution: as for the genus.

$\frac{3125}{5}$.	Sandheads, R. Hooghly.	Branch Pilots Milner and Barnett.
$\frac{689\text{–}690}{7}$.	Madras.	Purchased.
$\frac{1206\text{–}1207}{7}$.	Port Blair, Andamans.	G. H. Booley.
$\frac{4532}{7}$.	Madras.	"Investigator."
$\frac{3727\text{–}3728}{9}$.	Orissa coast. 7 fathoms.	"Investigator."
$\frac{7906}{9}$.	Sandheads, R. Hooghly.	Branch Pilot Milner.
$\frac{7946\text{–}7947}{9}$.	Sandheads, R. Hooghly.	Branch Pilot Daly.
$\frac{235\text{–}236}{10}$.	Karáchi.	"Investigator."
$\frac{3593}{10}$.	Lat. 23° 33′ N. Long. 67° 27″ E. 62 fathoms.	"Investigator."

Conchœcetes andamanicus, Alcock. Plate III., fig. 17.

Conchœcetes andamanicus, Alcock, Journ. Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 152.

As to the validity of this species, which is founded on three very small specimens, I am by no means sure.

It differs from adults of *C. artificiosus* in the following particulars:—

The carapace is more depressed and a little more elongate. Though the front is cut into 3 teeth the lateral ones alone are large and conspicuous, the median one being minute and invisible in a dorsal view. There is no spine or tooth on the upper border of the orbit. The antero-lateral borders though granular are thin and overhanging and have no traces of spines or teeth. The subhepatic regions are granular, but are not bounded by distinct rows of granules.

Instead of two blunt tubercles behind the finger-joint of the chelipeds there is a single large subacute tubercle.

In the largest specimen the carapace is 7·5 millim. long and 7 millim. broad.

$\frac{2859}{7}$. Port Blair, Andamans. G. H. Booley.

This species also roofs itself in with a valve of a dead Lamellibranch.

Dromia, Fabr.

Dromia, Fabricius, Ent. Syst. Suppl., p. 359. Latreille (55, 56 & 57), Leach (60), Risso (89 & 90), Desmarest (28), H. Milne Edwards (79), Lamarck (54), De Haan (23), Dana (21), Stimpson (99), Henderson (42), Ortmann (84), Alcock (3).

For references see J. A. S. B., LXVIII., pt. 2, 1899, p. 136.

All parts except the tips of the fingers and of the dactyli are, generally, tomentose.

Carapace not elongate in the adult, strongly convex or subglobose.

Front cut into three teeth, of which the middle one is on a lower plane than the others and is often so much smaller than them and so much deflexed as to be hardly visible from a dorsal view.

Palate well delimited from the epistome: efferent branchial channels well defined, but not always bounded by distinct and unbroken ridges.

The chelipeds may have some of the joints nodose, but the ambulatory legs are smooth.

None of the legs have the merus dilated. The last two pair of legs are distinctly subcheliform, the spine at the end of the propodite against which the dactylus closes being well developed.

The sternal grooves of the female do not meet, and they end opposite the bases of the 1st pair of true (monodactylous) ambulatory legs.

The branchial formula of *Dromia Rumphii* and *D. cranioides* is as follows, but in *D. unidentata* the epipodite is absent from the chelipeds:—

Somites and their appendages.	Podobranchiæ.	Arthrobranchiæ. Anterior.	Arthrobranchiæ. Posterior.	Pleurobranchiæ.	
VII	ep.	0	0	0	= 0 ep.
VIII	1+ep.	0	0	0	= 1+ep.
IX	0 ep.	1	1	0	= 2+ep.
X	0 ep.	1	1	0	= 2+ep.
XI	0	1	1 (small)	1	= 3
XII	0	1	1 (small)	1	= 3
XIII	0	1	0	1	= 2
XIV	0	0	0	1	= 1
Total	1+4 ep.	5	4	4	= 14+4 ep.

The posterior arthrobranchiæ of somites XI and XII are short and abruptly truncated.

Distribution: off the shores of all tropical and warmer temperate seas round the globe, from the West Indies eastwards to Australia, and extending as far north as the English Channel and Japan, in shallow water usually.

Key to the Indian species of Dromia.

I. An epipodite on the chelipeds: antero-lateral border of the carapace cut into teeth:—

1. Carapace in the adult broader than long, the median frontal tooth prominent in a dorsal view: last two pairs of legs of nearly equal size ... ... *D. rumphii.*

2. Carapace in the adult at least as long as broad, the median frontal tooth very inconspicuous in a dorsal view: last pair of legs much longer than the penultimate pair ... *D. cranioides.*

II. No epipodite on the chelipeds: antero-lateral border of the carapace, between the orbit and the cervical groove, entire: both the anterior and the posterior borders of the propodite of the last pair of legs end in large spines ... ... *D. unidentata.*

Dromia Rumphii, Fabr. Plate II., fig. 4.

Dromia Rumphii, Fabricius, Ent. Syst. Suppl., p. 360.

[Rumph (92), Seba (94)] Milne Edwards (79), De Haan (23), Stimpson (99), Tozzetti (103), Hilgendorf (45), Miers (67), Walker (105), Ortmann (82), Henderson (43), Alcock (3).

For references see J. A. S. B., LXVIII., pt. 2, 1899, p. 137.

All parts, except the tips of the fingers and dactyli thickly covered with a harsh tomentum, with sometimes scattered tufts of longer hair on the carapace.

Carapace in adults broader than long, strongly convex, smooth; the cardiac

region and the branchial or "cervical" groove on either side of it plainly marked, the gastric region faintly indicated.

Front cut into 3 nearly horizontal teeth of nearly equal size, the middle one on a lower plane and slightly the most prominent.

In young specimens a projection of the upper edge of the "orbit" marks the position of the true inner supra-orbital angle of the higher Brachyura, but in large specimens this is obsolete.

The true antero-lateral borders of the carapace are cut into 3 sharp but coarsish spines, the 2nd of which often has a small secondary denticle at its base. The postero-lateral borders are convergent and have one large coarse spine, placed immediately behind the cervical groove. In addition there is a spine on the summit of the infra-orbital lobule, and another at the outer angle of the buccal cavern.

The borders of the arm are dentate, especially the upper border, and there are 2 or 3 teeth at the distal end of the upper border of the wrist and also along the upper border of the hand: all these dentations tend to disappear with age, but two tubercles at the distal end of the outer surface of the wrist are persistent.

The last two pair of legs are about equal in length, being hardly half as long as either of the first two pair: their propodites are much shortened and their dactyli are claw-like, forming chelæ with the opposing spines at the end of the propodites.

Abdomen of male with a broad convex ridge down the middle line.

Sternal tubercles of female very prominent.

An epipodite is present on the chelipeds.

Distribution: Indo-Pacific Seas from the Red Sea, Mozambique, and Mauritius, to Japan.

1120.	Persian Gulf.	W. T. Blanford, F. R. S.
1171.	Tuticorin. 5 fathoms.	"Investigator"
1527.	Madras.	Purchased.
$\frac{7356}{6}$.	Off Malabar coast. 29 fathoms.	"Investigator."
$\frac{573\text{–}574}{7}$.	Ceylon.	Colombo Museum.
$\frac{691}{7}$.	Madras.	Purchased.
$\frac{3729}{9}$.	Orissa coast. 25 fathoms.	"Investigator."
$\frac{5635\text{–}5636}{9}$.	Off Malabar coast. 28 fathoms.	"Investigator."
$\frac{1579}{10}$.	G. of Martaban. 67 fathoms.	"Investigator."
$\frac{3539}{10}$.	Off Malabar coast. 49 fathoms.	"Investigator."

Dromia cranioides, de Man. Plate II., fig. 5.

Dromidia cranioides, de Man, Journ. Linn. Soc., Zool., XXII., 1887-88, p. 208, pl. xiv., figs. 6–8: Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 138.

This species may perhaps prove to be identical with the *Dromia indica* briefly characterized by Gray (Zool. Miscell., p. 40).

Carapace globose, a little longer than broad, perfectly smooth except for the cervical groove and for two small faint elevations side by side just behind the front.

Front cut into 3 teeth, the middle one of which is so small and on a plane so much lower than the others that it is hardly seen in a dorsal view.

A strongly-marked acuminate tooth near the middle of the upper border of the orbit is equivalent to the inner supra-orbital angle of higher Brachyura. Sub-orbital lobe dentiform, very prominent. Outer orbital angle well defined, sub-dentiform. A tooth, but not a strongly pronounced one, at the outer angle of the buccal cavern.

True antero-lateral borders of the carapace cut into 3 or 4 teeth; when 4, it is by intercalation of a little tooth close to the base of the 1st.

Postero-lateral borders slightly convergent, with one tooth placed immediately behind the branchial or "cervical" groove.

Borders of arm granular or obtusely denticulate, as also are the upper border of the wrist and of the hand: two tubercles at the distal end of the outer surface of the wrist.

The last two pair of legs have a claw-like dactylus which meets, in a cheliform manner, a spine at the end of the corresponding propodite. The last pair are much longer than the last pair but one, being, in fact, very little shorter than either of the first two pair.

Abdomen as in *D. Rumphii*.

The sternal grooves of the female approach one another closely, but do not actually meet, on the segment of the sternum corresponding with the 1st pair of ambulatory (monodactylous) legs, near the anterior end of which segment they terminate, without tubercles.

The chelipeds carry an epipodite.

The length of the carapace of the largest specimen is 28 millim., its greatest breadth is 26 millim.

697.	Port Blair, Andamans.	Wood-Mason Coll.
$\frac{8112}{6}$ (Type of the species).	Mergui.	Anderson Coll.
$\frac{8697}{6}$ and $\frac{2838}{7}$	Port Blair, Andamans.	G. H. Booley.
$\frac{9967}{6}$.	W. Coral Bank, Andamans. 15 fathoms.	"Investigator."

Dromia unidentata, Rüppell. Plate II., fig. 6.

Dromia unidentata, Rüppell, 24 Krabben roth. Meer., p. 16, pl. iv. fig. 2, pl. vi. fig. 9. H. Milne Edwards (79), A. Milne Edwards (72), Hilgendorf (45), Müller (81), Alcock (3). *Dromidia unidentata*, Kossmann (51), de Man (25), Cano (15), Henderson (43), Ortmann (83).

For references see J. A. S. B., LXVIII., pt. 2, 1899, p. 139.

Carapace about as long as broad, strongly convex, with some dimples when denuded, two of which, separating the post-gastric from the branchial regions, are specially conspicuous. Cervical groove well marked.

Front cut into two broadish but sharp teeth, between which, but on a very much lower plane, is an extremely inconspicuous denticle.

A broad tooth near the middle of the upper border of the orbit. Outer orbital angle prominent but not dentiform. Suborbital lobe bluntly dentiform, but not prominent.

Antero-lateral borders entire, rather sharp. A slight projection, hardly amounting to a tooth, on the postero-lateral border, immediately behind the branchial or "cervical" groove.

Chelipeds smooth, except for two tubercles at the far end of the outer surface of the wrist.

The fourth (last) pair of legs are not so very much shorter than either of the first two pair and are very much longer than the 3rd pair. The propodites of the last two pair are broader than long and are very spiny, one of the spines in the case of the last pair being at least as long as the spine against which the claw-like dactylus closes—so much so, that the last pair of legs appear to end in 3 claw-like spines the middle one being the dactylus.

The abdomen of the male, when denuded, has a broad convex ridge down the middle line; but when not denuded, the terminal segments of the male abdomen form with the basal joints of the chelipeds and first two pair of legs a remarkably flat surface, owing to the abrupt angular bending up of the last three abdominal segments.

The sternal grooves of the female approach one another closely, but do not actually meet, on the segment of the sternum corresponding with the 1st pair of monodactylous (ambulatory) legs, near the anterior end of which segment they terminate, but without tubercles.

No epipodites on the chelipeds.

The carapace of the largest specimen is 24 millim. long, and 22·5 millim. in greatest breadth.

In one of the male specimens, in which the vasa deferentia are, as usual, wonderfully prominent, there are also openings in the basal joints of the ante-penultimate pair of legs, corresponding with the genital openings of the female.

Distribution: Red Sea and East coast of Africa, Persian Gulf, Ceylon, Coromandel coast, Andaman Sea, Malay Archipelago.

711.	Port Blair, Andamans.	Wood-Mason Coll.
$\frac{8113}{6}$.	Mergui.	Anderson Coll.
$\frac{735}{10}$.	Persian Gulf.	F. W. Townsend.

Cryptodromia, Stimpson.

Cryptodromia, Stimpson, Proc. Acad. Nat. Sci. Philad., 1858 (1859), p. 225. Miers (65), Haswell (38), Henderson (42), Ortmann (84), Thomson (102), Alcock (3).

Epidromia, Kossmann, Reise roth. Meer. Crust., p. 69.

For references see J. A. S. B., LXVIII., pt. 2, 1899, p. 140.

As *Dromia*, but the legs, or at least the first two pairs of them, as well as the chelipeds, are nodular or verrucose. The ridges that define the efferent branchial channels are distinct. The chelipeds may carry a small epipodite, but not in any of the Indian species.

All the species are small.

Distribution: Indo-Pacific, from the Red Sea, East coast of Africa, and Mauritius, eastwards through the coasts of India and the East Indian Archipelago, to China and Japan and Australia and New Zealand. Occasionally found in moderate depths up to 150 fathoms, or even nearly up to 500 fathoms.

Key to the Indian species of Cryptodromia.

1. Carapace smooth (non-granular):—

    1. No spines on *dorsal surface* of carapace:—

        i. Front cut into 3 teeth, all of which are plainly visible in a dorsal view: antero-lateral borders of carapace with more than one tooth: legs nodular:—

            a. Antero-lateral borders with 3 teeth (not including the outer orbital angle and some teeth on the subhepatic region) ... ... *C. pileifera.*

            b. Antero-lateral borders with 2 teeth (not including the outer orbital angle, *etc.*):—

                α. Regions of carapace well defined: no tubercle on the surface of the maxillipeds ... ... *C. canaliculata.*

                β. A pearl-like tubercle in the middle of the exposed surface of the merus of the external maxillipeds ... ... *C. bullifera.*

ii. Front cut into 3 teeth, the middle one of which is hardly seen in a dorsal view: antero-lateral borders of carapace with a single tooth, at their anterior end: legs hardly nodular ... ... *C. Hilgendorfii.*

2. A dorsal spine on the hepatic region of the carapace, just behind the outer orbital angle ... . *C. de Manii.*

II. Carapace (and appendages also) profusely granular: the regions of the carapace well defined and areolated:—

1. Carapace subcircular in outline, its antero-lateral borders nondentate, the median frontal tooth the most prominent ... *C. ebalioides.*

2. Carapace pentagonal in outline, its antero-lateral borders dentate, the lateral frontal teeth the most prominent ... ... *C. Gilesii.*

Cryptodromia pileifera, Alcock. Plate II., fig. 7.

Cryptodromia tuberculata var. *pileifera*, Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 141.

Body covered with a short scanty scurfy tomentum which does not conceal the texture beneath.

Carapace broader than long, convex, smooth, without distinction of regions: the cervical groove broad, shallow.

Front cut into 3 broad triangular teeth of about equal size, the middle one of which is on a lower plane than the others and is deflexed.

A sharp tooth near the middle of the upper border of the orbit marks the true inner supra-orbital angle. Outer orbital angle dentiform. Suborbital lobe dentiform and very prominent.

True antero-lateral border cut into 3 or 4 blunt teeth: in the gap between the 1st tooth and the outer orbital angle two subhepatic teeth—one of which is large—may show up and may, from a dorsal view, look as if they belonged to the antero-lateral border: there are two similar teeth, one alone of which is conspicuous, at the outer angle of the buccal cavern. On the postero-lateral border, at the branchial or cervical groove, is a denticle.

Wrist and palm, and corresponding joints of first two pair of legs, sharply and profusely nodular or tubercular on the outer surface: fingers compressed, meeting only at tip.

The third pair of legs, though much slenderer and less nodular than the first two pair and only about half their length, are fashioned on much the same plan, except that the propodite is much shortened: the spinule at the end of the propodite of this pair is not always big enough to form a chela with the claw-like dactylus.

Last (4th) pair of legs slender and smooth, a good deal longer than the penultimate pair: their propodite has spines at the end of both borders, the

spine at the end of the anterior border being large enough to form a chela with the dactylus.

Abdomen of the male slightly convex along the middle line, the 4th and 5th terga with some little nodules: in the female the 3rd–5th terga have the surface a little uneven, but not distinctly nodular.

Every specimen has a commensal sponge which covers it completely like a cap.

In the Indian Museum are 70 specimens from the Andaman reefs.

The carapace of a large egg-laden female is 9 millim. long and 11 millim. broad.

705.	Port Blair, Andamans.	Wood-Mason Coll.
$\frac{1941\text{-}1950}{7}$, $\frac{2272\text{-}2281}{7}$	Types of the species. Great Coco I.	A. Alcock.
$\frac{3884}{9}$.	Off Little Andaman, 10 fathoms.	"Investigator."

Cryptodromia canaliculata, Stimpson. Plate II., fig. 8.

Cryptodromia canaliculata, Stimpson, Proc. Acad. Nat. Sci. Philad. 1858 (1859), p. 240. de Man (24), Ortmann (82), Alcock (3).

Dromia tomentosa, Heller (39). *Cryptodromia tomentosa*, Hilgendorf (45), Kossmann (51). *? Cryptodromia pentagonalis*, Hilgendorf (45), Henderson (43), Ortmann (83).

For references see J. A. S. B., LXVIII., pt. 2, 1899, p. 142.

Tomentum short, close, velvet-like.

Carapace not quite as long as broad, only moderately convex, its surface smooth, its regions very fairly indicated: the cervical groove is distinct, the fronto-orbital region is marked off by a shallow transverse groove that runs forwards from one antero-lateral angle of the carapace round to the other, and the front itself is longitudinally grooved.

Front cut into 3 broad triangular teeth of nearly equal size, the middle one nearly horizontal, but on a much lower plane than the others, which are somewhat upcurved.

A tooth near the middle of the upper border of the orbit marks the position of the true inner supra-orbital angle. Outer orbital angle dentiform. Infra-orbital lobe dentiform and prominent.

True antero-lateral borders with 2 teeth of which the anterior is the more prominent and acute: in the well-marked gap between the 1st (large) tooth and the outer orbital angle a stout subhepatic tooth shows up: below this again is a tooth at the outer angle of the buccal cavern.

On the postero-lateral border, immediately behind the branchial or cervical groove, is a tooth.

Outer surface of wrist nodular: a few nodules on upper border of palm: fingers short and stout.

The carpus and propodite of the first 2 pair of legs are nodular.

Last 2 pair of legs short and slender, not nodular, not much more than half the length of the first 2 pair: the 4th (last) pair very little longer than the 3rd. Both end in a strong claw-like dactylus, but are hardly cheliform, although there is a small spine at the end of the propodite of each.

Abdomen of male with a convex ridge down the middle line.

The carapace of the largest specimen is 14 millim. long, and nearly 16 millim. in breadth.

Distribution: Indo-Pacific Seas from the Red Sea and east coast of Africa to the Loo-choo Is.

349.	Persian Gulf.	W. T. Blanford.
$\frac{2249}{7}$.	Great Coco I., Andamans.	A. Alcock.

Cryptodromia bullifera, Alcock. Plate II., figs. 9, 9*a*.

Cryptodromia bullifera, Alcock, Journ. Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 143.

Body covered with a short tomentum.

Carapace about as long as broad, convex, smooth, the cervical groove distinct. Front cut into 3 acute rather slender teeth, the middle one of which is on a lower plane and slenderer than the others. An acute spine near the middle of the upper border of the orbit marks the position of the true inner supra-orbital angle. Outer orbital angle spiniform. Suborbital lobe dentiform, fairly prominent.

True antero-lateral borders of the carapace cut into 2 teeth, the anterior being much the larger and spine-like. In the gap between the 1st tooth and the outer orbital angle two small smooth subhepatic tubercles are visible, one below the other.

An elegant pearl-like tubercle below the sub-orbital lobe, a similar but smaller tubercle in the middle of the ventral surface of the merus of the external maxillipeds and another in the middle of the ventral surface of the second joint of the antennal peduncle, are characteristic.

An extremely inconspicuous denticle on the postero-lateral border, behind the branchial or cervical groove.

Outer surface of wrist and upper surface of hand nodular, two of the nodules on the wrist being particularly acute.

Outer surface of carpus and propodite of first 2 pair of legs broken but not nodular.

Last 2 pair of legs slender and very short, ending in claw-like dactyli, but not cheliform.

Abdomen of male convex along the middle line.

The carapace is between 5 and 6 millim. long, and about 5 millim. broad.

$\frac{5351}{9}$. Off Ceylon. 34 fathoms. "Investigator."

$\frac{52}{7}$. (TYPE OF THE SPECIES). $7\frac{1}{2}$ m. E. of N. Cinque I. Andamans. 490 fathoms. "Investigator."

Cryptodromia de Manii, Alcock.

Cryptodromia de Mani, Alcock, Journ. Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 144.

Carapace etc. tomentose.

Carapace as long as broad, convex, smooth, the cervical groove rather indistinct. Front cut into 3 teeth, the middle one of which is the smallest and is much deflexed.

A tooth near the middle of the upper border of the orbit (true inner supra-orbital angle). Outer orbital angle dentiform. Suborbital lobe dentiform, but not very prominent.

True antero-lateral border with two blunt teeth: two more blunt teeth on the subhepatic border and one at the angle of the buccal cavern are continued on from the antero-lateral border. A tiny denticle on the postero-lateral border, just behind the branchial or cervical groove.

A tooth on the hepatic region, dorsad of the antero-lateral border, and just behind the outer orbital angle, is characteristic.

Outer surface of wrist and upper surface of hand nodular; outer surface of hand granular.

Outer surface of carpus and propodite of first two pairs of legs uneven. Last two pairs of legs short, ending in claw-like dactyli, notcheliform; the penultimate pair shorter than the last pair.

Carapace 5 millim. long and not quite 5 millim. broad.

$\frac{8202}{6}$. (TYPE OF THE SPECIES). Mergui. Anderson Coll.

The unique specimen is in too bad a state to be decently figured.

Cryptodromia Hilgendorfi, de Man. Plate III., fig. 11.

Cryptodromia Hilgendorfi, de Man, Archiv f. Naturges. LIII., 1887, i., p. 404, pl. xviii., fig. 3: Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 145: Nobili, Ann. Mus. Genov. (2) XX., 1899, p. 249.

Carapace etc. with a short velvet-like tomentum.

Carapace longer than broad, convex, smooth, without distinction of regions. Cervical groove broad and shallow.

Front cut into 3 teeth, the lateral ones broad and triangular, the middle one so small and deflexed as to be little visible in a dorsal view.

There is no distinct tooth in the upper border of the orbit, but only an angular bulge, to mark the position of the inner supra-orbital angle. Outer orbital angle and sub-orbital lobe subdentiform.

The antero-lateral borders of the carapace are smooth and entire, but as they bend sharply inwards towards the orbits their anterior angle forms a forwardly-directed tooth, the space between which and the outer-orbital angle is concave.

A very small prominence on the postero-lateral border, just behind the branchial or cervical groove.

The chelipeds and legs have an uneven surface, but are not really nodular, though both the inner and outer angles of the wrist are strongly pronounced.

The last 2 pair of legs are short and slender, the 4th (last) pair being very little longer than the 3rd; both end in stout claw-like dactyli but are not markedly cheliform.

The abdomen bends in very sharply from the 4th segment, making the under surface of the body very flat.

The carapace of the larger of the two Indian Museum specimens is 12 millim. long, and nearly 12 millim. broad.

Distribution: Persian Gulf, East Indian Archipelago.

$\frac{3541}{10}$. Persian Gulf. A. R. S. Anderson.

Cryptodromia cbalioides, Alcock. Plate III., fig. 12.

Dromia (*Cryptodromia*) *cbalioides*, Alcock, Journ. Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 145.

Carapace hardly at all tomentose: a few hairs on the borders of some of the leg-joints.

Carapace subcircular with projecting front, convex, *its surface, like that of the appendages, everywhere closely and crisply granular:* not only are all its regions well defined, but they are also areolated, *all the areolæ being convex and particularly well circumscribed.*

Front longitudinally grooved, cut into 3 serrulate teeth, the middle one of which is slender and prominent, while the lateral ones are broadly-triangular and little prominent.

Upper border of orbit serrulate, very oblique, devoid of any tooth or spine. Outer orbital angle and suborbital lobe not salient.

The lateral borders of the carapace, which run below the orbit to the angles of the buccal cavern, and the suborbital lobes are serrulate but are not cut into teeth, though there may be a granular tubercle in front of the cervical groove and another behind it.

The chelipeds and legs are crisply and closely granular, the chelipeds and first two pairs of legs being also nodular. In the wrist the inner, and even more the outer, angle are dentiform.

Last two pairs of legs slender, hardly half the length of the first two pairs, ending in claw-like dactyli, but not cheliform: the last pair are hardly longer than the penultimate pair.

The abdominal terga are granular and more or less sculptured.

The carapace of the largest specimen is 7 millim. long and 8 millim. broad.

$\frac{182\text{-}183}{10}$. (TYPES OF THE SPECIES). Karáchi. "Investigator."

Cryptodromia Gilesii, Alcock. Plate III., fig. 13.

Dromia (*Cryptodromia*) *Gilesii*, Alcock, Journ. Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 146.

No tomentum: only a few hairs on some of the leg-joints.

Carapace pentagonal, convex, its greatest length about equal to its greatest breadth, the greater part of its surface covered with vesiculous granules: not only are all the regions very distinct, but they are also areolated—the areolæ however not being so individually convex as they are in *D. ebalioides*.

Front cut into 3 triangular teeth, of which the middle one is the smallest and is on a lower plane and obliquely deflexed.

Upper orbital border very oblique: a hardly noticeable angulation—not a distinct tooth—marks the true inner supra-orbital angle. Outer orbital angle not pronounced. Suborbital lobe dentiform but inconspicuous.

Antero-lateral borders of the carapace cut into 5 small granular lobules or tubercles, of which only 2 belong to the true antero-lateral border, the other 3 being on the subhepatic border and at the outer angle of the buccal cavern. A granular tubercle on the postero-lateral border, just behind the cervical groove.

Legs and chelipeds crisply granular, the chelipeds and first 3 pair of legs being also nodular: the nodules on the carpal joints being prominent and acute.

Last 2 pair of legs very slender, hardly half the length of the first 2 pair, ending in hook-like dactyli, not cheliform.

All the abdominal terga are symmetrically sculptured and granular.

The carapace of an egg-laden female is 8 millim. long and $8\frac{1}{2}$ millim. broad.

This species which is closely related to *D. sculpta* Haswell, is easily distin-

guished from *D. ebalioides* (1) by the sharply pentagonal carapace and less-completely isolated areolæ, (2) by the much more prominent front, (3) by the antero-lateral borders being broken by irregular tubercle-like lobules, and (4) by the more abundant sculpture of the abdominal terga: in everything but the form of the meropodites of the chelipeds and first pair of legs it strongly resembles *Petalomera*.

$\frac{5621\text{-}5634}{9}$. (Types of the species). Off Malabar coast, 28 fathoms. "Investigator."

Named after Lt.-Col. G. M. J. Giles, I.M.S., who was Surgeon-Naturalist to the Investigator from 1884–1888.

Petalomera, Stimpson

Petalomera, Stimpson, Proc. Acad. Nat. Sci. Philad. 1858 (1859), p. 226: Alcock, J. A. S. B, LXVIII. pt. 2, 1899, p. 147.

Closely resembles *Cryptodromia*, especially those species (e.g. *C. ebalioides* and *Gilesii*) in which the carapace is granular and areolated, and indeed only differs from *Cryptodromia* in having the upper border of the meropodites of the chelipeds and next, or next two, pair of legs cristiform.

The sternal grooves of the female are widely separated and end on the posterior part of the sternum corresponding with the 1st pair of (monodactylous) ambulatory legs.

The chelipeds carry a small epipodite.

Distribution: Ceylon, Andamans, Japan, N. Australia.

Petalomera indica, Alcock. Plate III., figs. 14, 14*a*.

Petalomera granulata var. *indica*, Alcock, Journal Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 148.

Carapace etc. hardly at all hairy: edges of the legs with some hairs.

Carapace a little longer than broad, convex in both directions, with very numerous unevenly distributed vesiculous granules all the regions are distinct, but are not all equally well defined. The cervical and branchial grooves are both present.

Front dorsally grooved in the middle line, cut into 3 serrulate teeth, of which the lateral ones are large and triangular, while the middle one is small and is on a much lower plane.

Upper border of orbit serrulate: a tooth near its middle marks the true inner supra-orbital angle. Outer orbital angle pronounced but not dentiform The suborbital lobe forms a granular tubercle or denticle.

Antero-lateral borders of the carapace cut into 3 granular teeth, the first being subhepatic.

Chelipeds very much more massive than the legs: they and the first pair of legs have the merus petaloid, owing chiefly to the thin expanded crest-like upper border of that joint. The merus of the next pair of legs is not petaloid, though its upper border is sharp. In the chelipeds the inner border of the wrist and the upper border of the palm are prominent and, like the upper and outer surfaces of those joints, are granular: there are also two sharp tubercles at the distal end of the outer surface of the wrist.

The first two pair of legs have a few small granules on some of the joints.

The last two pair of legs are slender and end in small claw-like dactyli, which are opposed to a very small spine at the end of the corresponding propodites: the last pair of legs is very slightly longer than the penultimate pair.

In both sexes the abdomen has a convex ridge down the middle line and the 2nd–5th or 6th terga have a few scattered granules on their surface.

The largest specimen is slightly over 15 millim. long, and is 15 millim. broad, but in young specimens the carapace is more elongate.

Colours of fresh spirit specimens: yellow with some reddish markings.

In the Indian Museum are 22 specimens, from the Andamans and from off Ceylon 28 and 34 fathoms.

This species is to be distinguished from *P. granulata* only in not having the merus of the second pair of legs (3rd pereiopods) petaloid.

From *P. pulchra* Miers (Zool. H. M. S. "Alert," p. 260, pl. xxvii. fig. A), it differs in having a tooth on the supra-orbital border, which border is serrulate, not entire, and in being more granular.

713. (Types of the species). Port Blair, Andamans. Wood-Mason Coll.

$\frac{8699}{6}$ & $\frac{2839}{7}$. Andamans. G. H. Booley.

$\frac{5352\text{-}5359}{9}$. Off S. coast Ceylon, 34 fathoms. "Investigator."

$\frac{1134}{10}$. Off N.-E. coast Ceylon, 28 fathoms. "Investigator."

$\frac{3512}{10}$. Andamans. "Investigator."

Lasiodromia n.n.

Homalodromia, Miers (*nec* Homolodromia A. M. Edw., 1880), Zool. H. M. S. Alert, p. 553, 1884.
Pseudodromia, Alcock (*nec* Stimpson, Henderson, Ortmann), J. A. S. B., LXVIII., pt. 2, 1899, p. 149.

Body and appendages remarkably tomentose.

Carapace somewhat elongate. Front broad, deeply cut into two prominent lobes, each of which again is broadly bifid: the gap between the two lobes is in contact with the epistome.

Palate well delimited from the epistome: efferent branchial channels well defined by low ridges.

Chelipeds not longer, and but little more massive, than the first two pair of ambulatory legs. None of the legs verrucose or dilated. The last pair of legs are slender, and are much longer than the penultimate pair and little shorter than any of the others.

The sternal grooves of the female end in a pair of prominent juxtaposed divergent tubercles placed at the level of the base of the chelipeds.

No epipodite on the chelipeds.

Distribution: Seychelles, Laccadives, Ceylon.

The peculiar form and breadth of the front is due to the prominence of the supra-orbital eave and especially of the supra-orbital tooth, which have fused with the front.

I am still in doubt on the question of separating *Lasiodromia* (=*Homalodromia*) from *Pseudodromia*.

The name *Homalodromia* is so extremely similar in sound to *Homolodromia* (A. M. Edw., 1880), that it would be very inconvenient to retain it. I therefore propose a new name *Lasiodromia* in allusion to the long shaggy fringe of the anterior border of the carapace.

Lasiodromia Coppingeri (Miers). Plate III., figs. 15, 15*a*.

Homalodromia Coppingeri, Miers, Zool. H. M. S. Alert, p. 554, pl. L., fig. B.

Pseudodromia quadricornis (an *Homalodromia Coppingeri ?*) Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 149.

Body and appendages tomentose, with numerous long hairs: a line of peculiarly long silky hairs forms a fringe or false anterior border to the carapace behind the deflexed front.

Front deflexed, dorsally grooved in the middle line, cut into two broad teeth, each of which is fused at base with a broad and peculiarly prominent supra-orbital tooth; so that the front appears to consist of two widely-separated lobes each of which is bifid.

Carapace in the adult longer than broad, slightly convex from side to side, almost flat fore and aft behind the line of long hairs that marks the frontal declivity: its surface, when denuded, is quite smooth: only the branchial or cervical groove and the cardiac region are distinctly marked.

Lateral borders of carapace entire, except that there may be a tiny denticle behind the branchial groove, slightly convergent posteriorly.

Outer orbital angle dentiform. Sub-orbital lobe dentiform, deflexed.

Chelipeds and legs comparatively slender, the chelipeds shorter and hardly stouter than the legs. Two acute tubercles on the outer surface of the wrist.

Fourth (last) pair of legs little slenderer and about as long as either of the first two pair, ending in a slender claw-like dactylus to which a spinule at the end of the propodite is opposed to form an almost perfect chela.

Third pair of legs not less stout than, but only about half the length of, the first two pair; ending in a claw-like dactylus.

Length of carapace of an adult female 7 millim., greatest breadth—in front of the branchial groove—6 millim.

$\frac{8885}{6}$. Off Pedro Shoal (N. of Laccadives). "Investigator."

$\frac{5347\text{-}5350}{9}$. Off S. coast Ceylon. 34 fathoms. "Investigator."

II. HOMOLIDEA, Alcock.

Homoliens (partim) Milne Edwards, Hist. Nat. Crust. II. p. 180.

Homolidæ, Henderson, Challenger Anomura, p. 18: Ortmann in Bronn's Thier-Reich, Malacostraca, p. 1155.

Homolinæ, A. Milne Edwards & E. L. Bouvier, Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 9.

Homolidea, Alcock, Journ. Asiatic Soc. Bengal, Vol. LXVIII., pt. 2, 1899, p. 126.

Carapace longer than broad, *lineæ anomuricæ* usually present. The eyes are not retractile into orbits nor the antennules into pits. Basal antennular joint subglobular.

The slender basal joint of the eyestalk is almost always plainly visible, and is sometimes of great length.

The antennal flagella are, except in the *Latreillidæ*, much longer than the carapace.

The interantennulary septum is a distinct vertical process, and is not formed merely by the close apposition of the apex of the epistome to the front.

The front forms a slender triangular prominent rostrum, which may be bifid at tip and often has a spine on either side of its base.

The division between the epistome and palate is distinct, but the vault of the palate is shallow.

External maxillipeds pediform or sub-operculiform.

The chelipeds and legs are long and slender: the fingers are not channelled *en cuillère*. Only the last pair of legs is dorsal and reduced in size.

Sternum of the female broad, without any special longitudinal grooves.

The abdomen of the male, and usually but not always of the female also, consists of seven separate segments. There are no lateral platelets intercalated between the 6th and 7th segments.

The gills are phyllobranchiæ, and the gill-plumes vary in number from 14 to 8 on either side.

The species are, for the most part, confined to deep water.

The *Homolidea* are divided into two families as follows:—

Key to the families of Homolidea.

I. The slender basal joint of the eyestalk is not much longer, or may even be much shorter, than the terminal joint. The gill-plumes are 13 or 14 on either side and epipodites are present on the chelipeds and often also on the first two pairs of ambulatory legs — HOMOLIDÆ.

II. The slender basal joint of the eyestalk is much longer than the terminal joint. The gill-plumes are 8 on either side and no epipodites are present on the chelipeds or legs ... ... LATREILLIDÆ.

The genus *Homologenus* Henderson=*Homolopsis* A. M. Edw. (A. Milne Edwards, Bull. Mus. Comp. Zool. VIII. 1880, p. 34: Henderson, Challenger Anomura, p. 20: Bouvier, Bull. Soc. Philomath. Paris (8) VIII. 1896, p. 63: Ortmann, Bronn's Thier-Reich, Malacostraca, p. 1156: Milne Edwards and Bouvier, Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 12), appears to represent a distinct section of the *Homolidæ*, differing from all other known *Homolidea* in the following characters:—the epistome is reduced and is hidden between the basal joints of the antennules, the 2nd maxillipeds have neither an epipodite nor a gill-plume (podobranch), and the external maxillipeds carry a podobranch.

Family HOMOLIDÆ, Alcock.

Homolidæ sensu restricto, Alcock, Journ. Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 130.

Carapace elongate-quadrangular, or ovoid, or urn-shaped. Antennal flagella longer than the carapace. The slender basal joint of the eyestalk is either very little longer, or a good deal shorter, than the terminal joint. The external maxillipeds are pediform or subpediform. In all the Indian species that belong to this family the gills are 14 on either side and there are epipodites on the chelipeds and first two pairs of ambulatory legs, the branchial formula being as follows:—

Somites and their appendages.	Podobranchiæ.	Arthrobranchiæ.		Pleurobranchiæ.		
		Anterior.	Posterior.			
VII	ep.	0	0	0	=	ep.
VIII	1+ep.	0	1	0	=	2+ep.
IX	0 ep.	1	1	0	=	2+ep.
X	0 ep.	1	1	0	=	2+ep.
XI	0 ep.	1	1	1	=	3+ep.
XII	0 ep.	1	1	1	=	3+ep.
XIII	0	1	0	1	=	2
XIV	0	0	0	0	=	0
Total	1 (6 ep.)	5	5	3	=	14 (6 ep.)

Key to the genera of Homolidæ.

I. Carapace deep. External maxillipeds decidedly pediform. Terminal joint of the eyestalk very much longer than the basal joint, which is entirely hidden by the basal joint of the antennule. Dactylus of last pair of legs not nearly half the length of its propodite and closing against the *distal* end of the latter joint ... ... HYPSOPHRYS

II. External maxillipeds subpediform, the antero-external angle of the merus being dilated. Dactylus of last pair of legs about half as long as its propodite and opposed to a tubercle on the posterior border or proximal end of the latter joint. Basal joint of eyestalk not entirely hidden :—

1. Carapace not depressed, its hepatic spine some distance behind the level of the supra-orbital spine ... ... HOMOLA.

2. Carapace depressed, its hepatic spine almost on the same level as the supra-orbital spine ... ... PAROMOLOPSIS.

None of the eight Indian species of *Homolidæ* are likely to fall in the way of ordinary collectors, since five of them inhabit depths between 100 and 1000 fathoms, and of the other three only one has, so far, been taken in less than 50 fathoms of water.

HOMOLA, Leach.

Homola, Leach, Trans. Linn. Soc. XI. 1815, p. 324, and Zool. Miscell. Vol. II., p. 82. Latreille (57), Desmarest (29), Risso (90), Roux (91), Milne Edwards (79), de Haan (23), Dana (21), Heller (40), Henderson (42), Ortmann (82 & 84), A. Milne Edwards and Bouvier (76), Alcock (3 & 4.)

For references, see J. A. S. B., LXVIII., pt. 2, 1899, p. 154.

Carapace deep, longer than broad, quadrilateral or urn-shaped, with deep vertical sides, the gastric region well demarcated and occupying the anterior half of the carapace, the linea anomurica distinct and dorsal.

Front narrow, forming a rostrum, which is either entire or bifid at tip and has a spine, often of large size, on either side of its base.

The orbits are quite incomplete and do not even conceal the eyestalks, and the eyes, which project far outside them, are retractile against the sides of the carapace. The eyestalks are long and the slender basal joint is slightly longer than the terminal joint.

The epistome is fairly or very distinctly marked off from the palate. The expiratory canals are very well defined. The external maxillipeds are subpediform.

The chelipeds are rather slender and generally somewhat spiny. The legs are long and more or less compressed and spiny, the last pair are subcheliform, but have the propodite dilated near the basal end and never twice the length of the dactylus.

The abdomen of both sexes consists of seven separate segments and is rather broad.

Distribution : West Indies and Atlantic coasts of North America, Azores and Atlantic coasts of Europe, Mediterranean, East Indian Seas from Cape Comorin to the Philippines: commonly at considerable depths up to nearly 500 fathoms.

The species of Homola may be grouped in three subgenera, as follows :—

(1) Homola (Type *H. barbata*). Carapace quadrate, its broadest part being in front, across the middle of the gastric region: the *lineæ anomuricæ* keep close to the lateral borders and are rather inconspicuous. Rostrum a bifid tooth, with a small spine or tooth on either side of its base. The last pair of legs reach to the end of the preceding pair.

(2) Homolax (Type *H. megalops*). Carapace urn-shaped, its broadest part being behind, across the middle of the branchial regions: the *lineæ anomuricæ* run well inside the lateral borders and are conspicuous. Rostrum as in *Homola*. The last pair of legs reach beyond the carpus of the preceding pair.

(3) Paromola Wood-Mason (Type *H. cuvieri*). Carapace decidedly macrurous in form, its greatest breadth being behind: the *lineæ anomuricæ* run well inside the lateral borders and are very conspicuous. Rostrum a simple cylindrical spine, flanked on either side by a spine of equal or greater size. The last pair of legs do not reach beyond the end of the merus of the preceding pair.

Subgenus Homola.

Homola andamanica, Alcock. Plate IV., fig. 20.

Homola andamanica, Alcock, Investigator Deep-Sea Brachyura, p. 7, and Illustrations of the Zool. of the Investigator, Crust., pl. xl., fig. 1 : J. A. S. B., LXVIII., pt. 2, 1899, p. 156.

Carapace elongate-subquadrilateral, its greatest breadth is across the middle of the gastric region, behind which point its sides are quite straight and vertical: it is well calcified, and, like all other parts except the antennary flagella, is covered with short soft but stiff hairs that are not thick-set enough to form a coat of concealment.

Rostrum a depressed dorsally-grooved tooth, bifid at tip. Four spines on the anterior border of the carapace, namely, one on either side of the rostrum and one at either supra-orbital angle.

Lateral borders of dorsum of carapace straight, very slightly convergent, spinate; the first spine, which stands alone on the hepatic region, is of pre-eminent size, the second though much smaller than the first is much larger than any of the others.

Gastric region very well demarcated, armed with nine large spines—three in a triangle on either median area, one on either lateral area, and one on the hinder part of the central area.

Some spines on the subocular, subhepatic, and pterygostomian regions—largest on the subocular region, where they are definitely arranged in two crescentic rows. Two spines on the carapace outside the antenna-peduncle, in addition to the spiniuliform suborbital angle.

Eyes somewhat reniform: the joint on which they are borne is shorter than the slender basal joint.

Chelipeds slender, but distinctly stouter than the legs, more hairy than the carapace, especially along the edges of the joints. Upper and lower borders of arm spiny; wrist with rows of spines on the outer surface and a spine or two at the inner angle; lower border of hand dentate, upper border of hand denticulate, cutting edges of fingers sharp, entire.

Legs compressed, their edges plumed with short bristles, with long bristles interspersed. The second and third pair, which are a dactyl-length longer than the first, are not quite $2\frac{1}{2}$ times the length of the carapace: in all three pairs both edges of the merus are armed with stout spines—at least in the distal half, and the posterior border of the propodite and dactylus with compressed articulated spines which are distant and acicular on the propodite, but stout very regular and close-set on the dactylus.

The subcheliform fourth pair of legs reach very slightly beyond the end of the carpus of the preceding pair: the merus has 3 or 4 spines on the lower border and a terminal spine on the upper border, the claw-like dactylus closes against a bunch of spines on the near end of the propodite.

In a female the carapace is about 27 millim. long, and about 21 millim. wide.

$\frac{1384}{10}$.	Andaman Sea 13° 16′ 30″ N. 93° 8′ E. 79 fathoms.	"Investigator."
$\frac{2691}{10}$.	Andaman Sea 13° 17′ N. 93° 7′ E. 90 fathoms.	"Investigator."

Types of the species.

This species closely resembles the Atlantic and Mediterranean *H. barbata*, from which indeed it differs only in the following particulars:—

The eyes are more reniform. The second spine of the lateral border of the carapace is just behind the hepatic region, instead of being on that region. There are spines on the posterior border of the meropodites of all four pairs of walking legs.

Subgenus Homolax.

Homola (*Homolax*) *megalops* Alcock. Plate. IV., fig. 21.

Homola megalops, Alcock, Ann. Mag. Nat. Hist., May 1894, p. 408: Illustrations of the Zool. of the Investigator, Crust., pl. xiv., figs. 1, 1*a*: Investigator Deep Sea Brachynra, p. 9: J. A. S. B., LXVIII., pt. 2, 1899, p. 158.

Carapace urn-shaped, its greatest breadth is across the middle of the branchial region; its sides, and still more the spinulate lateral borders of its dorsum, are elegantly curved; the hairs that cover it are so inconspicuous as to be recognizable only with a lens.

Rostrum a depressed dorsally-grooved tooth, entire, or emarginate at tip. Four spines on the anterior border of the carapace arranged as in *H. andamanica*.

The only enlarged spine of the lateral border stands alone on the hepatic region.

Nine spines on the gastric region—two immediately behind the spines at the base of the rostrum, the other seven in an open S-shaped curve across the middle of the region.

A single row of spines on the subocular region, which region is remarkably hollowed for the reception of the retracted eye. Two spines, one above the other, on the carapace beside the antenna-peduncle, in addition to the blunt suborbital tooth.

Eyes reniform, very large, their major diameter being one-sixth the breadth of the carapace: the joint on which they are borne is as long as the slender basal joint.

Chelipeds slender, their arms and wrists distinctly slenderer than the meropodites of the ambulatory legs: in the adult male they do not reach half-way along the merus of the first pair of legs: they are covered with a short inconspicuous velvet, with hardly any long bristles on the edges of the joints: they are armed much as in *H. andamanica*, but the *upper* border of the hand is spiny and the lower border faintly denticulate. The fingers, which have a sharp entire cutting-edge, are as long as the rest of the hand.

The ambulatory legs have the surface—especially the dorsal surface—of most of the joints covered with a close short velvet, but have few or no bristles along their edges. The 2nd and 3rd pair, which are nearly a dactylus longer than the first, are nearly three times as long as the carapace: the subcheliform 4th (last) pair reach beyond the end of the carpus of the preceding pair. The first three pair have the anterior edge of their greatly compressed meropodite closely spinate, and the posterior edges of that joint and the ischium closely spinulate; their last three joints have the edges unarmed, except for a series of fine capillary spinelets hardly distinguishable from bristles along the merus and carpus, and a few small jointed spinules at the base of the posterior border of the dactylus. The last pair of legs have the posterior edge of their subcylindrical meropodite closely spinate and have only a single terminal spine on the upper edge, the carpus has a strong terminal spine on its posterior border, and the propodite has a salient group of spines behind the middle of its posterior border forming a subcheliform stump for the serrated posterior edge of the claw-like dactylus.

Colour in life salmon-pink.

Dimensions of carapace of a full-grown specimen 41 millim. long, 36 millim. broad.

$\frac{6928\text{-}6929}{9}$. (Types of the species). Andaman Sea, 11°·31′ 40″ N. 92° 46′ 40″ E. 188–220 fathoms. "Investigator."

$\frac{8832}{9}$. Off Colombo, 142–400 fathoms. "Investigator."

$\frac{8958\text{-}8960}{9}$. Off Madras coast, 13° 51′ 12″ N. 80° 28′ 12″ E. 145–250 fathoms. "Investigator."

$\frac{2580\text{-}2585}{10}$. Andaman Sea, 14° 13′ N. 93° 40′ E. 370-419 fathoms. "Investigator."

Subgenus Paromola Wood-Mason.

Homola (Paromola) profundorum, Alc. & And. Plate V., fig. 22.

Homola profundorum, Alcock and Anderson, Ann. Mag. Nat. Hist., Jan. 1899, p. 5: Alcock, Investigator Deep Sea Brachyura, p. 10, pl. i. fig. 2: J. A. S. B., LXVIII., pt. 2, 1899, p. 159.

Carapace very decidedly macrurous, deep, ovoid-triangular, broadest abaft the middle of the branchial region, tapering to an acutely-spiniform rostrum of which the length is about a third that of the rest of the carapace. Diverging from either side of the base of the rostrum is a spine of similar form and size. The only other elevations on the carapace are a hepatic spine just behind the hollow for the retracted eye, an antennal spine just outside the antennal base, and a blunt denticle near the middle of the ill-defined lateral border.

The gastric region is well delimited, and the *linea anomurica* is broad conspicuous and dorsal.

The stout cylindrical terminal joint of the eye-stalks is longer than the slender basal joint, the eyes are of good size, well pigmented, and hemispherical.

The chelipeds are slender but are stouter than the legs; the arm has the outer lower border spinate and, on the upper border, a few spinules and a strong terminal spine; both the inner and the outer angles of the wrist are armed with a strong spine, the fingers are much shorter than the hand and have the cutting-edge entire.

The ambulatory legs are slender and subcylindrical, the 2nd and 3rd pair, which are slightly longer than the first, are at least three times the length of the carapace. In the first 3 pair there are a few distant spines and a strong terminal spine on the anterior border of the merus, a few articulating spinules at the far end of the posterior border of the propodite, and a comb of articulating spines along the posterior border of the dactylus—the last joint being but half the length of the last but one. The dorsal fourth pair of legs are far slenderer than the others and do not reach the end of the merus of the preceding pair: their propodite is triangular, owing to the expansion of its posterior border, and

opposes a sharply-serrated edge to the less strongly toothed posterior border of the short dactylus—the parts being cheliform rather than subcheliform.

The body and appendages are coated with very short distant bristles which do not conceal the surface: there are some longer and thicker bristles along the edges of the chelipeds, and a very few scattered hairs along the edges of the legs.

The carapace is about 13 millim. long, and about 9 millim. in greatest breadth, in a young female.

$\frac{2374\text{-}2376}{10}$. (TYPES OF THE SPECIES). { Off Travancore coast, 430 fathoms. / 7° 17′ 30″ N. 76° 54′ 30″ E. } "Investigator."

PAROMOLOPSIS, Wood-Mason.

Paromolopsis, Wood-Mason, Ann. Mag. Nat. Hist., March 1891, p. 268: Alcock, Investigator Deep Sea Brachyura, p. 11, and J. A. S. B., LXVIII., pt. 2, 1899, p. 160.

Differs from Homola in the following characters:—

The carapace, which is urn-shaped, is *depressed*, its side-walls being far from vertical and being overhung by the sharply-defined lateral borders. The hepatic region is elongate and advanced, so that the hepatic spine is on a level with the spines of the anterior border of the carapace and helps to form a very distinct "orbit."

Distribution: Seas of India from 300 to 600 fathoms.

Paromolopsis Boasi, Wood-Mason. Plate V., fig. 23.

Paromolopsis Boasi, Wood-Mason, Ann. Mag. Nat. Hist., March 1891, p. 268 and fig. 5: Alcock, *ll. cit.*

Every part of the body and appendages, except the antennal flagella, covered with a short close downy tomentum.

Carapace ending in a short triangular rostrum with an upturned tip; its greatest breadth, which is across the middle of the branchial regions, is equal to its length without the rostrum: the lateral border is well-defined throughout, is carinated, is co-extensive with the length of the carapace, and ends in a large triangular hepatic spine the tip of which is on a level with the tips of the spines of the anterior border: these are four in number, one on either side of the rostrum and one at either outer orbital angle.

There are two small antennal spines, there are some definitely-placed nodular swellings on the well defined gastric region, and the surface of the denuded carapace is granular, but there are no spines other than those mentioned.

The swollen terminal joint of the eyestalk is rather longer than the slender basal joint: eyes of good size, well pigmented, hemispherical, retractile into a very decided hollow in the front wall of the hepatic region.

The 2nd joint of the antenna-peduncle is not produced or acute at the antero-external angle; the antennal flagellum is much longer than the carapace.

Chelipeds (in the adult female and young male) short, just reaching beyond the end of the carpus of the first pair of legs: the arm is slenderer than the corresponding joint of the first three pair of legs: the fingers are longer than the hands: none of the joints are spinate.

The second and third ambulatory legs, which are longer than the first by their dactylus, and longer than the fourth by their merus and dactylus, are 3 times the length of the carapace. In the first three pair the anterior border of the meropodite is armed with large spines, but the other joints are unarmed: the dactylus is slender, curved, and of great length, being hardly shorter than the preceding joint.

In the subcheliform, dorsal, fourth (last) pair the anterior border of the merus ends in a spine and the posterior border of the merus is spiny throughout, the propodite is much dilated and toothed at its basal angle posteriorly, so as to be *l*-shaped, and has one or two spines on the undilated portion of its posterior border, and the dactylus is short and is toothed along the posterior border.

The carapace of an adult female is 45 millim. long and 43·5 millim. broad.

The colours in life vary from red to bluish-pink.

$\frac{3735}{9}$. (Type of the species).	Bay of Bengal, about 30 miles W. of Middle Andaman I.	480–500 fathoms.	"Investigator."
$\frac{3178}{9}$.	G. of Manár, 6° 29′ N., 79° 34′ E.	597 fathoms.	"Investigator."
$\frac{6930\text{–}6931}{9}$.	B. of Bengal, 13° 47′ 30″ N., 92° 36′ E.	561 fathoms.	"Investigator."
$\frac{107}{10}$: $\frac{787\text{–}789}{10}$.	Arabian Sea, 9° 34′ 57″ N., 75° 36′ 30″ E.	406 fathoms.	"Investigator."
$\frac{2378}{10}$.	Andaman Sea, 13° 50′ 30″ N., 93° 26′ E.	498 fathoms.	"Investigator."
$\frac{2388}{10}$.	Arabian Sea, 7° 17′ 30″ N., 76° 54′ 30″ E.	430 fathoms.	"Investigator."
$\frac{3743}{10}$.	Arabian Sea, 10° 8′ 43″ N., 75° 33′ 30″ E.	295–360 fathoms.	"Investigator."

Hypsophrys, Wood-Mason.

Hypsophrys, Wood-Mason, Ann. Mag. Nat. Hist., March 1891, p. 269: Alcock, Investigator Deep Sea Brachyura, p. 12, and J. A. S. B., LXVIII., pt. 2, 1899, p. 162.

Carapace deep, longer than broad, quadrilateral or ovate-oblong, with deep vertical parallel sides, the gastric region well delimited and occupying its anterior half, the *linea anomurica* dorsal, distinct or indistinct.

Front narrow, forming a simple or bifid rostrum which has a spine on either side of its base.

The orbits do not afford any concealment to the eyes, but form, on either side of the rostrum, a broad concave facet sharply marked off from the rest of the carapace by a ridge that arches round dorsally from the rostrum to the antennal spine: at the upper and inner angle of this facet is a well defined hollow that catches the knee of the 2nd and 3rd joints of the antennulary peduncle when flexed. The eyes are well formed: the terminal joint of the eye-stalk is barrel-shaped much as in *Homola*, but the slender basal joint is short or obsolescent, so that the eyes do not appreciably project beyond the edge of the orbital facet.

The mouth-parts are very like those of *Homola*, but as the outer border of the merus of the external maxillipeds is hardly at all expanded these appendages are even more pediform than in *Homola*.

Chelipeds slender, spiny, equal. Legs of the first three pair long, with broad compressed meropodites. Fourth (last) pair of legs short, very slender, cheliform, their dactylus, which is many times shorter than their propodite, shutting down against and co-terminous with the slightly expanded distal end of the propodite.

The abdomen of both sexes consists of seven separate segments.

Distribution: Arabian Sea and Bay of Bengal between 400 and 1000 fathoms.

Key to the species of Hypsophrys.

I.	Rostrum simple: gastric region verrucose	*H. superciliosa.*
II.	Rostrum bifid: gastric region spinose	*H. longipes.*

Hypsophrys superciliosa, Wood-Mason. Plate VI., fig. 24.

Hypsophrys superciliosa, Wood-Mason, Ann. Mag. Nat. Hist., March 1891, p. 269: Ill. Zool. Investigator, Crust., pl. xiv., figs. 4, 4*a*: Alcock *ll. cit.*

Rostrum simply pointed. Linea anomurica rather indistinct.

Four small spines or teeth on the anterior (orbital) border of the carapace, two being far apart at the base of the rostrum and one at either outer orbital angle. Two, or all four, of these teeth may be obsolescent or obsolete.

Lateral borders of dorsum of carapace not defined, except by a single isolated spine on the hepatic region. Gastric region sharply subdivided into three subregions, of which the lateral are somewhat nodular. Two or three spines on the subhepatic and suborbital region, the innermost of which is "antennal," also sometimes a few spinules.

Eyes well formed and facetted, but pale. Antennal flagella about half again as long as the carapace.

The pediform external maxillipeds have their surfaces and edges devoid of spines.

Chelipeds slender, but much more massive than the ambulatory legs, about half a hand-length shorter than the first pair of ambulatory legs in the adult male: spines and spinules in rows on edges and on both inner and outer surfaces of arms, wrists and hands: fingers about three-fourths the length of the palm.

The second pair of legs, which are slightly longer than the first and third and considerably more than twice the length of the fourth, are slightly more than three times the length of the carapace. In the first three pair the meropodites are compressed, with the anterior border spiny and the posterior border much less strongly and profusely spiny; the other joints are slender and unarmed, except for a few articulating spinelets at the far end of the posterior border of the propodite and in the basal half of the posterior border of the dactylus; the dactylus is slightly shorter than the propodite.

The fourth (last) pair are very slender and are unarmed except at their cheliform ending: their propodite is many times longer than the dactylus.

The terminal joint of the male abdomen is bluntly triangular.

There are some soft bristles on the chelipeds, and a few on the legs, and some very short and inconspicuous hairs on the carapace.

Colours in life, pink; fingers blackish.

The carapace of a large egg-laden female is 19 millim. long and 15 millim. broad.

$\frac{6225\text{–}6226}{9}$ $\frac{6227\text{–}6228}{9}$	(Types of the species).	Arabian Sea, 15° 2′ N., 72° 34′ E.	740 fathoms. "Investigator."
$\frac{8523\text{–}8532}{9}$.		Arabian Sea, 12° 5′ 35″ N., 71° 35′ 50″ E.	865–880 fathoms. "Investigator."
$\frac{69\text{–}87}{10}$.		Arabian Sea, 15° 11′ N., 72° 28′ 45″ E.	912–931 fathoms. "Investigator."
$\frac{88\text{–}91}{10}$.		Arabian Sea, 13° 47′ N., 72° 3′ 45″ E.	891 fathoms. "Investigator."
$\frac{92}{10}$.		Arabian Sea, 22° 14′ 25″ N., 67° 8′ 55″ E.	947 fathoms. "Investigator."
$\frac{93}{10}$.		Arabian Sea, 23° 8′ 22″ N., 65° 49′ 45″ E.	890 fathoms. "Investigator."
$\frac{3742}{10}$.		Bay of Bengal, 10° 50′ 30″ N., 80° 44′ 30″ E.	987–900 fathoms. "Investigator."

Hypsophrys longipes, Alcock & Anderson. Plate VI., fig. 25.

Hypsophrys longipes, Alcock and Anderson, Ann. Mag. Nat. Hist., Jan. 1899, p. 6: Alcock, Investigator Deep Sea Brachyura, p. 15, pl. i., fig. 1: J. A. S. B., LXVIII., pt. 2, 1899, p. 164.

Rostrum deeply bifid. Linea anomurica distinct.

Four large spines on the anterior border of the carapace—two close together at the base of the rostrum, one at either orbital angle.

Lateral borders of dorsum of carapace well defined, spinulate; the ridge on the side-wall of the carapace that defines the branchial regions anteriorly is also spinulate. A row of spines on the hepatic region, the largest of which is on the lateral border of the carapace and has a spine dorsad of it.

Gastric region obscurely subdivided, each lateral subregion is armed with 5 or 6 large spines, while on the median region there is a central spine sometimes followed by a row of spinules. Subhepatic and suborbital region with numerous large spines, one of which is "antennal."

Eyes well pigmented. Antennal flagella more than twice the length of the carapace.

Rows of spinules on the exposed surface of the ischium merus and exopodite of the external maxillipeds, and a row on the basal joint of the antennules.

Chelipeds slender, reaching not far beyond the end of the carpus of the first pair of ambulatory legs, the arm and wrist not stouter than the meropodites of the first 3 pair of legs; spinate and spinulate as in the preceding species; fingers as long as the hand.

The second and third pair of legs, which are slightly longer than the first and three times as long as the fourth, are four times the length of the carapace. In the first three pair of legs the merus is compressed and has its anterior border spinate and its posterior borders spinulate, the posterior border of the propodite carries a few distant articulating spinelets, and the dactylus—which is about two-thirds the length of the preceding joint—has a close comb of articulating spines along its posterior border.

The fourth (dorsal) pair, which are extremely slender, have the posterior border of the merus strongly spinate: the propodite is several times longer than the minute dactylus.

The terminal joint of the male abdomen ends acutely.

Hairs and bristles are sparsely present just as in the preceding species.

The carapace of a large egg-laden female is 38 millim. long and 30 millim. broad.

$\frac{2365\text{–}2369}{10}$. (Types of the species). Arabian Sea, 7° 17′ 30″ N., 76° 54′ 30″ E. 430 fathoms. "Investigator."

$\frac{2387}{10}$

Family Latreillidæ, Alcock.

Latreillidæ, Alcock, Journ. Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 130.

Carapace either elongate-quadrangular or piriform. Antennal flagella shorter than the carapace. The slender basal joint of the eyestalk is very much longer than the terminal joint. The external maxillipeds are suboperculiform. The gills are 8 on either side and there are no epipodites on the chelipeds or ambulatory legs.

The branchial formula is as follows :—

Somites and their Appendages.	Podobranchiæ.	Arthrobranchiæ.	Pleurobranchiæ.	
VII	ep.	0	0	= ep.
VIII	1+ep.	0	0	= 1+ep.
IX	ep.	2	0	= 2+ep.
X	0	2	0	= 2
XI	0	0	1	= 1
XII	0	0	1	= 1
XIII	0	0	1	= 1
XIV	0	0	0	= 0
Total	1+3 ep.	4	3	= 8+3 ep.

Key to the genera of Latreillidæ.

I. Carapace subquadrilateral. Antennæ long. All seven abdominal segments distinct in both sexes ... ... Latreillopsis.

II. Carapace piriform, its anterior portion forming a long subcylindrical "neck." Antennæ short. The 4th, 5th and 6th abdominal segments of the female are fused together ... ... Latreillia.

Latreillia, Roux.

Latreillia, Roux, Crust. Medit. pl. xxii. and text. Milne Edwards (79), DeHaan (23), Heller (40), Henderson (42), A. Milne Edwards and Bouvier (76), Bouvier (12), Ortmann (84), Alcock (3).

For references see J. A. S. B., LXVIII., pt. 2, 1899, p. 167.

Carapace elongate-piriform, not covering the basal joints of the legs, its anterior part prolonged to form a subcylindrical "neck" at the end of which are the spiniform rostrum (lying deflexed between two long slender divergent "supra-ocular" spines) the eyes, the antennules, and the antennæ. The regions are fairly well indicated, and there is no *linea anomurica*.

The eyes are large, and the slender basal joint of the eyestalk is of extraordinary length, being several times longer than the terminal joint. Antennæ short, filiform.

Epistome of great length fore and aft, corresponding with the "neck" of

the carapace. Buccal cavern well demarcated from the epistome, the efferent branchial channels well defined. External maxillipeds not completely closing the buccal orifice: they have a pediform cast, the ischium and merus being rather narrow and the flagellum coarse.

Chelipeds long and slender, but always much shorter than the first three pairs of ambulatory legs: all the joints are slender, except the palm, which in one or both sexes is club-shaped. Fingers shorter than the palm.

First three pair of ambulatory legs very long and slender; some of their joints are spiny.

Fourth (last) pair of legs more or less reduced in length, subdorsal in position.

The abdomen of the male consists of seven separate segments; that of the female consists of five segments—the 4th, 5th and 6th being fused together.

Distribution: Atlantic coasts of North America between 38° and 40° N.: off the Canaries and Azores: Mediterranean Sea: Bay of Bengal and Andaman Sea: Japanese Seas: New South Wales coast.

Latreillia pennifera, Alcock. Plate VII., fig. 27.

Latreillia pennifera, Alcock, Journal Asiatic Soc. Bengal, LXVIII., pt. 2, 1899, p. 168.

Very closely related to *L. elegans*, Roux.

Carapace smooth, without spines, though the hepatic regions have a strong bulge: the "neck" is rather slender (equally so in both sexes) and is nearly as long as the rest of the carapace measured in the middle line.

Rostral spine short, acute, strongly deflexed. Supraocular spines as long as the eyestalks, about half the total length of the carapace ("neck" included) measured in the middle line; occasionally bearing some tiny secondary spinules.

Antennules slightly longer than the eyestalks: the outer flagellum longer and very much coarser than the inner.

The chelipeds, which are slightly longer in the male than in the female, are between $3\frac{1}{2}$ and 4 times the total length of the carapace: their joints are long, slender, and cylindrical, except the palm of the male, which is club-shaped: there are a few spines on the arm, but the other joints are smooth: the fingers are not half the length of the palm.

The first 8 pair of ambulatory legs, though they increase slightly in length from before backwards, are not very dissimilar in length, the first pair being nearly 8 times the total length of the carapace. All their joints are slender: the merus is spinate, the carpus sparsely spinate, and the propodite is slightly dilated at the far end of the posterior border where there are a few spines.

The last pair of legs are between $4\frac{1}{2}$ and 5 times the total length of the carapace and reach almost to—in the female even beyond—the end of the carpus of the last pair but one: the merus is rather sparsely spinate, chiefly on the posterior border, and the propodite is plumed on both sides so as to exactly resemble the vane of a feather: the dactylus is extremely short.

In both sexes the last abdominal segment is shaped like a spearhead: in the female the 2nd and 3rd abdominal terga have a median spine and the 4th has a spine at the proximal end of either lateral border.

Colours in spirit yellow. In life the carapace is reddish with longitudinal stripes of dark red, the eyestalks chelipeds and legs are closely cross-banded with red, and the eyes are purplish black.

The carapace of an adult female, with eggs, is 11 millim. long.

$\frac{1095}{10}$.	Bay of Bengal, 8° 51′ 30″ N., 81° 11′ 52″ E.	28 fathoms.	"Investigator."
$\frac{1713\text{–}1718}{10}$ $\frac{3538}{10}$.	(TYPE OF THE SPECIES). G. of Martaban, 14° 26′ N., 96° 23′ E. 67 fathoms.		"Investigator."
$\frac{3896}{10}$.	Off Torres Is., Mergui Archipelago.	40 fathoms.	"Investigator."

Latreillopsis, Henderson.

Latreillopsis, Henderson, Challenger Anomura, p. 21: Ortmann in Bronn's Thier Reich, Malacostraca, p. 1156: Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 165.

Carapace subquadrilateral, deepish, with vertical side-walls, not entirely concealing the basal joints of the legs: the regions fairly well indicated. Front of moderate width, ending in a spiniform rostrum on either side of which is a long slender divergent supraocular spine. Linea anomurica present, most distinct posteriorly.

Eyes as in *Latreillia*, large and borne free at the end of slender eyestalks of remarkable length. Antennæ long, the peduncle slender and cylindrical.

Epistome well demarcated from the palate. Buccal cavern much broader in front than behind, the efferent branchial channels very well defined. Though the external maxillipeds do not quite meet across the buccal cavern they are distinctly operculiform, owing to the expansion of their merus.

Chelipeds long and slender but much shorter than the first 3 pairs of ambulatory legs: their joints, like those of the legs, are cylindrical, and the palm in the male is enlarged and club-shaped.

Ambulatory legs slender, the first 3 pairs very long; the fourth pair reduced in length, and subchelate.

The abdomen in both sexes consists of 7 separate segments.

Distribution : Oriental Seas at moderate depths up to nearly 100 fathoms.

Latreillopsis bispinosa, Henderson. Plate VII., fig. 26.

Latreillopsis bispinosa, Henderson, Challenger Anomura, p. 22, pl. 11, fig. 3, ♀ : Alcock, J. A. S. B., LXVIII., pt. 2, 1899, p. 166.

Carapace longer than broad, shaped much as in *Homola :* frontal region with three sharp slender spines, the middle one—which is the shortest and is slightly deflexed—being the rostrum, the other two—which are about a third the length of the carapace and are slightly up-tilted—being placed above the bases of the eyestalks. Gastric region tumid, with a tubercle posteriorly and a curved transverse row of tiny tubercles anteriorly. Cardiac region small, tumid, culminating in two tubercles placed side by side or confluent. Branchial regions with an irregular surface, and with one or two tiny spinules on the side wall. Hepatic regions standing out like a pair of little wings, with two spines—the foremost of which is nearly as long as the rostrum—projecting obliquely forwards from their prominent outer angle, and with one or two small spinules on their under surface. Eyestalks nearly as long as the supraocular spines. Antennal peduncle about as long as the eyes and eyestalks combined, the flagellum more than three-fourths the length of the carapace.

Chelipeds and legs slender, cylindrical, practically smooth, except for a spine at the far end of the anterior (extensor) border of the merus. The chelipeds in the male are just over twice, in the female less than twice, the length of the carapace without the rostrum. In the female they are hardly stouter than the legs; but in the male they are distinctly stouter, especially as regards the palm, which is club-shaped : the palm is much longer than the fingers.

The first three pairs of ambulatory legs increase in length, gradually but slightly, from before backwards, the 3rd pair being between 4 and $4\frac{1}{2}$ times the length of the carapace : the dactyli are long and curved. The fourth (last) pair of legs are a little longer than the male chelipeds : their last two joints are short, and the dactylus folds down, like a knife-blade, on a double row of spines along the posterior border of the propodite.

In both sexes the last abdominal tergum is shaped like a spearhead, and the 2nd, 3rd, 4th and 6th terga have an acute tubercle in the middle line.

The carapace of an egg-laden female is 8 millim. long.

Colours in spirit yellow, the fingers and eyes dark brown.

$\frac{3284\text{–}3285}{10}$ — $\frac{3494}{10}$ Off the Andamans, 53 fathoms. "Investigator."

10

TABLE OF THE GENERA AND SPECIES OF DROMIDES.

The names of the Indian genera and species are printed in small capitals.

DROMIIDEA.

Family HOMOLODROMIDÆ.

Homolodromia A. Milne Edwards.	Bull. Mus. Comp. Zool. VIII. 1880, p. 32.	
„ *paradoxa*, A. Milne Edwards.	Bull. Mus. Comp. Zool. *loc. cit.* and Rec. Fig. Crust. Nouv. pl. 39, fig. 2: Bouvier, Bull. Soc. Philom. Paris (8) VIII. 1895-96.	Caribbean Sea.
Dicranodromia A. Milne Edwards.	Bull. Mus. Comp. Zool. VIII. 1880, p. 31: A. Milne Edwards and Bouvier, Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 14.	
„ *ovata*, A. Milne Edwards.	*Loc. cit.* p. 32: Bouvier, Bull. Soc. Philom. (8) VIII. 1895-96.	Caribbean Sea.
„ *Doderleini*, Ortmann.	Zool. Jahrb., Syst. VI. 1892, p. 549, pl. xxvi. fig. 4: Bouvier, Bull. Soc. Philom. Paris (8) VIII. 1895-96.	Japan Sea.
„ *Mayheuxi*, A. Milne Edwards.	Rec. Fig. Crust. Nouv. pl. 10: Bouvier, Bull. Soc. Philom. (8) VIII. 1895-96, p. 50: A. Milne Edwards and Bouvier, Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 14, and Exp. Sci. Travailleur et Talisman, Crust. Décap. Pt. I. p. 14, pl. iii. fig. 4, pl. ix, figs. 1–11.	E. Atlantic (Canaries and Azores).
ARACHNODROMIA Alcock.	*Ante.*	
„ BAFFINI, Alcock and Anderson.	*Ante.*	Indian Seas.

Family DYNOMENIDÆ.

DYNOMENE Latreille.	*Ante.*	
„ *hispida*, Desmarest.	Consid. Gén. Crust. p. 133, pl. xviii. fig. 2: Guerin, Icon. Règne Anim. pl. xiv. fig. 2: Milne Edwards in Cuvier, Règne Anim. pl. xl. fig. 2: and Hist. Nat. Crust. II. p. 180: A. Milne Edwards, Ann. Sci. Nat. (6) VIII. 1879, Art. 3, p. 5, pl. xii, pl. xiii. figs. 1-15: de Man, Archiv f. Naturges. LIII. 1887, i. p. 408: Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 543. *Dynomene latreilli*, Eydoux and Souleyet, Voy. Bonite, Zool. I. p. 239, pl. iii. figs. 3-5.	Indo-Pacific (Mauritius to Sandwich Is.).
„ *ursula*, Stimpson.	Ann. Lyc. Nat. Hist. New York VII. 1862, p. 239: A. Milne Edwards, Ann. Sci. Nat., Zool., (6) VIII. 1879, Art. 3, p. 9, pl. xiii. figs. 16–19.	California.

Dynomene *prælator*, A. Milne Edwards.	Ann. Sci. Nat., Zool., (6) VIII. 1879, Art. 3, p. 8, pl. xiv. figs. 20–26: Miers, P. Z. S. 1884, p. 13 (note): de Man, Archiv f. Naturges. LIII. 1887, i. p. 409: Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 543, pl. xxvi. fig. 3.	Indo-Pacific (Samoa to Madagascar.)
,, *Filholi*, Bouvier.	C. R. de la Soc. Philom. Paris, 1894–95, p. 6, and Bull. Soc. Philom. (8) VIII. 1895–96, pp. 58, 59, figs. 22, 23: Milne Edwards and Bouvier, Exp. Sci. Travailleur et Talisman, Crust. Décap. Pt. I, p. 5, pl. iii. pl. viii. figs. 1–18.	E. Atlantic (C. Verde Is. &c.).
,, *pugnatrix*, de Man.	Zool. Jahrb., Syst., IV. 1889, p. 444, pl. x. fig. 13.	Mauritius.
,, PILUMNOIDES, Alcock.	*Ante.*	Arabian Sea.
Acanthodromia A. Milne Edwards.	*Ante.*	
,, *erinacea*, A. Milne Edwards.	Bull. Mus. Comp. Zool. VIII. 1880, p. 31: Bouvier, Bull. Soc. Philom. (8) VIII. 1895–96, pp. 56, 57, figs. 18–21.	Caribbean Sea.
,, MARGARITA, Alcock.	*Ante.*	Andaman Sea.

Family Dromiidæ.

Dromia Fabr.	*Ante.*	
,, Rumphii, Fabr.	*Ante.*	E. Africa to Japan.
,, *vulgaris*, Edw.	Milne Edwards, Hist. Nat. Crust. II. 173, pl. xxi. figs. 5–8: Bell, Brit. Stalk-eyed Crust. p. 369: Heller, Crust. Südl. Europ. p. 145, pl. iv. figs. 10–11: Brocchi, Ann. Sci. Nat., Zool., (6) II, 1875, Art. 2, p. 106 (*male appendages*): Carrington and Lovett, Zoologist (3) VI. 1882, p. 259 (*habits*): Carus, Prodr. Faun. Medit. I. p. 498: Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 547: Bouvier, Bull. Soc. Philom. (8) VIII. 1895: Rathbun, P. U. S. Nat. Mus. XXII. 1900, p. 300: A. Milne Edwards and Bouvier, Exp. Sci. Travailleur et Talisman, Crust. Décap. pt. I. p. 17, pl. ix. fig. 15. (*Dromia mediterranea* Leach, Malac. Pod. Brit. pl. xxiv*a*: *Dromia communis*, Lucas, Hist. Nat. Anim. Artic. in Expl. Sci. Algérie, pt. I. p. 26).	E. Atlantic from the English Channel to the W. coast of Africa, Mediterranean.
,, *lator*, Edw.	Milne Edwards, Hist. Nat. Crust. II. 174 (*D. erythropus*, Rathbun, Ann. Inst. Jamaica, No. I. 1897, p. 39).	W. Indies.
,, *nodosa*, A. M. Edw. & Bouvier.	Exp. Sci. Travailleur et Talisman, Crust. Décap. pt. I. p. 18, pl. ix. figs. 12–14.	C. Verde Is.
,, *ciliata*, Henderson.	Challenger Anomura, p. 3, pl. I. fig. 1.	Australia.
,, *gibbosa*, Edw.	Milne Edwards, Hist. Nat. Crust. II. 175.	Loc. ?
,, *octodentata*, Haswell.	P.L.S., N. S. Wales, VI. 1881-82, p. 755 and Cat. Austral. Crust. p. 140.	S. Australia.

DROMIA *fulvo-hispida*, Miers.	Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 270, pl. xvi. fig. 1.	W. Africa.
„ *spinirostris*, Miers.	Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 271, pl. xvi. fig. 2.	W. Africa.
„ *bicavernosa*, Zietz.	Trans. Roy. Soc. S. Australia, X. 1886-87, p. 299, pl. xiv. figs. 5-6.	S. Australia.
DROMIDIA Stimpson. (subgenus of *Dromia*).	Proc. Acad. Nat. Sci. Philad. 1858, p. 225: Henderson, Challenger Anomura, p. 12. (*Dromidiopsis*, L. A. Borradaile, P. Z. S., 1900, p. 572).	
„ *hirtissima*, Lamarck.	Milne Edwards, Hist. Nat. Crust. II. 176: Dana, U. S. Expl. Exp. Crust. pt. I. p. 403: Brocchi, Ann. Sci. Nat. Zool. (6) II. 1875, Art. 2, p. 105 (*male appendages*).	S. Africa and Sandwich Is.
„ *globosa*, Lamarck.	Milne Edwards, Hist. Nat. Crust. II. 177: de Man, Archiv f. Naturges. LIII. i. 1887, p. 396, pl. xviii. fig. 1: Borradaile P. Z. S. 1900, p. 571.	Indo-Pacific
„ UNIDENTATA, Rüppell.	*Ante.*	Africa to Malay Archipelago.
„ *rotunda*, Macleay.	Smith's Illustr. of S. Africa, Annulosa, p. 71.	S. Africa.
„ INDICA, Gray.	Zool. Miscell., p. 40.	"Indian Ocean."
„ CRANIOIDES, de Man.	(probably identical with *D. indica* Gray.)	Andaman Sea.
„ *caput-mortuum*, Latr.	Milne Edwards, Hist. Nat. Crust. II. 178: de Man, Archiv f. Naturges. LIII. 1887, i. p. 393, pl. xvii. fig. 5.	Indian Ocean.
„ *spongiosa*, Stimpson.	Proc. Ac. Nat. Sci. Philad. 1858, p. 238: Henderson, Challenger Anomura, p. 12.	S. Africa.
„ „ var. *stimpsonii*, Miers.	Zool. H. M. S. Alert, pp. 519, 552, pl. L. fig. A.	Mozambique.
„ *excavata*, Stimpson.	Proc. Ac. Nat. Sci. Philad. 1858, p. 239: Haswell, Cat. Austral. Crust. p. 140.	Australia.
„ *australiensis*, Haswell.	P. L. S., N. S. Wales, VI. 1881-82, p. 755, and Cat. Austral. Crust. p. 139: de Man, Archiv f. Naturg. LIII. 1887, i. p. 396, pl. xvii. fig. 6: ? Henderson, Trans. Linn. Soc. Zool. (2) V. 1893, p. 406: Borradaile, P. Z. S., 1900, p. 572.	Indo-Pacific from Ceylon to Fiji.
„ „ var.	de Man, Zool. Jahrb., Syst., IX. 1896, p. 372.	Celebes.
„ *orientalis*, Miers.	Ann. Mag. Nat. Hist. (5) V. 1880, p. 370, pl. xv. figs. 1, 2.	"Indo-Malayan Seas."
„ *bicornis*, Studer.	Abh. Ak. Berlin, 1882 (1883), p. 20, pl. i. fig. 9 *a*, *b*: Henderson, Challenger Anomura, p. 13.	S. of Cape of Good Hope.
„ *spinosa*, Studer.	Abh. Ak. Berlin, 1882 (1883), p. 22, pl. i. fig. 10 *a*, *b*.	S. of Cape of Good Hope.
„ *antillensis*, Stimpson.	Ann. Lyc. Nat. Hist. New York, VII. 1862, p. 71: Henderson, Challenger Anomura, p. 12, pl. i. fig. 5.	G. of Mexico: Brazil.
CRYPTODROMIA Stimpson.	*Ante* (=*Epidromia*, Kossman).	
„ *coronata*, Stimpson.	Proc. Acad. Nat. Sci. Philad., 1858, p. 239: de Man, Archiv f. Naturg. LIII. 1887, i. p. 398, pl. xviii. fig. 2: Ortmann, Zool. Jahrb. Syst. VI. 1892, p. 543.	Bonin Is.: Moluccas.

CRYPTODROMIA *lateralis*, (Gray).	Zool. Miscell., p. 40: Stimpson, Proc. Ac. Nat. Sci. Philad., 1858, p. 239: Heller, Novara Crust., p. 71: Miers, Cat. Crust. New Zealand, p. 57: Haswell, Cat. Austral. Crust., p. 139: Miers, Zool. H. M. S. Alert, p. 259: Henderson, Challenger Anomura, p. 5: Cano, Boll. Soc. Nat. Napol. III. 1889, p. 255: Thomson, Trans. New Zealand Inst., 1898, p. 170, pl. xx. figs 1. 2: Whitelegge, Mem. Austral. Mus. IV. pt. 2, 1900, p. 163.	Australia, New Zealand. Japanese and China Seas.
,, *amboinensis*, de Man.	Archiv f. Naturg. LIII. 1887, i. p. 406, pl. xvii. fig. 4.	Moluccas.
,, *japonica*, Henderson.	Challenger Anomura, 1888, p. 6, pl. i. fig. 2: Whitelegge, Mem. Austral. Mus. III. 1897, p. 140.	Japan and Funa-futi.
,, *stearnsii*, Ives.	Proc. Ac. Nat. Sci. Philad., 1891, p. 216, pl. xii. figs. 1-3.	Japan.
,, *fallax*, (Lamk.).	Milne Edwards, Hist. Nat. Crust. II. 176.	Mauritius.
,, *tuberculata*, Stimpson.	Proc. Ac. Nat. Sci. Philad., 1858, p. 239: de Man, Archiv f. Naturges. LIII. 1887, i. p. 401.	China and E. Indian Seas.
,, PILEIFERA Alcock.	*Ante*.	Andaman Sea.
,, *tumida*, Stimpson.	Proc. Ac. Nat. Sci. Philad., 1858, p. 240: Ortmann, Zool. Jahrb. Syst. VI. 1892. p. 544.	China and E. Indian Seas.
,, sp. Miers.	Proc. Zool. Soc., 1879, p. 44.	Japanese Seas.
,, CANALICULATA, Stimpson.	(= *Dromia tomentosa*, Heller) *Ante*.	Red Sea to Japan.
,, PENTAGONALIS, Hilgendorf.	(= *? canaliculata*, St.) *Ante*.	Red Sea, India.
,, BULLIFERA, Alcock.	*Ante*.	Indian Seas.
,, *granulata* (Kossman).	Archiv f. Naturg. XLIV. 1878, p. 256 and Reiseroth. Meer., Crust., p. 69.	Red Sea.
,, *lamellata*, Ortmann.	Zool. Forschungsr. Malay. Arch. (in Jena. Denkschr. VIII.), 1894, p. 34, pl. ii. fig. 8.	Torres Str.
,, HILGENDORFI, de Man.	*Ante*.	Indian Seas.
,, *incisa*, Henderson.	Challenger Anomura, 1888, p. 10, pl. i. fig. 4.	Australia.
,, *nodipes*, (Lamk.).	Milne Edwards, Hist. Nat. Crust. II. 177.	Loc. ?
,, *sculpta*, Haswell.	P. L. S., N. S. W. VI. 1881-82, p. 756, and Cat. Austral. Crust., p. 141.	Australia.
,, *nodulifera*, Henderson.	Challenger Anomura, 1888, p. 8, pl. i. fig. 3.	Australia.
,, GILESII, Alcock.	*Ante*.	Indian Seas.
,, EBALIOIDES, Alcock.	*Ante*.	Indian Seas.
Eudromia Henderson.	Challenger Anomura, p. 13, 1888.	
,, *frontalis*, Henderson.	*Op. cit.*, p. 14, pl. i. fig. 7.	S. Africa.

PETALOMERA Stimpson.	*Ante.*	
,, *granulata*, Stimpson.	Proc. Ac. Nat. Sci. Philad., 1858, p, 240.	Japanese Seas.
,, *pulchra*, Miers.	Zool. H. M. S. Alert, p. 260, pl. xxvii. fig. A.	Torres Straits.
,, INDICA, Alcock.	*Ante.*	Indian Seas.
PSEUDODROMIA Stimpson.	Proc. Ac. Nat. Sci. Philad., 1858, p. 226: Henderson, Challenger Anomura, p. 15: Stebbing, S African Crust., p. 24.	
,, *latens*, Stimpson.	Proc. Ac. Nat. Sci. Philad., 1858, p. 240: Henderson, Challenger Anomura, p 16, pl. i. fig. 8: Stebbing, S. African Crust., p. 24.	S. Africa.
,, INTEGRIFRONS, Henderson.	Trans. Linn. Soc. Zool. (2) V. 1893, p. 406, pl. xxxviii. figs. 7–9.	S. India.
LASIODROMIA Alcock.	(= *Homalodromia*, Miers *nec* Edw.). *Ante.*	
,, COPPINGERI, Miers.	*Ante.*	Indian Ocean.
CONCHOECETES Stimpson.	*Ante.*	
,, ARTIFICIOSUS, Fabr.	*Ante.*	Indo-Pacific.
,, ANDAMANICUS, Alcock.	*Ante.*	Andamans.
Hypoconcha Guérin-Meneville.	Rev. et Mag. Zool. (2) VI, 1854, p. 333: Stimpson, Proc. Ac. Nat. Sci. Philad., 1858, p. 226: Henderson, Challenger Anomura, p. 17: Bouvier, Bull. Mus. d'Hist. Nat., Paris, 1898, p. 374.	
,, *sabulosa*, Herbst.	Krabben und Krebse, III. i. 57, pl xlviii. figs. 2, 3: Guérin-Meneville, Rev. et Mag. Zool. (2) VI. 1854, p. 333 pl. v: Stimpson *l. c.*: Henderson, *l.c.*: Bouvier *l.c.*	W. Indies.
,, *digueti*, Bouvier.	Bull. Mus. d'Hist. Nat., Paris, 1898, p. 376.	California.
,, *californiensis*, Bouvier.	Bull. Mus. d'Hist. Nat., Paris, 1898, p. 375.	California.
,, *panamensis*, S. I. Smith.	American Naturalist III. 1869, p. 249: Bouvier, Bull. Mus. d'Hist. Nat., Paris, 1898, p. 375.	Panama.
,, *arcuata*, Stimpson.	Ann. Lyc. Nat. Hist. N. York, VII. 1862, p 72: Kingsley, Proc. Acad. Nat. Sci. Philad, 1879, p. 404: Bouvier, Bull. Mus. d'Hist. Nat., Paris, 1898, p. 375.	W. Indies, Florida, &c.
SPHÆRODROMIA Alcock.	*Ante.*	
,, KENDALLI, Alc. & Anders.	*Ante.*	B. of Bengal.
,, NUX, Alcock.	*Ante.*	G. of Martaban.

[*Ascidiophilus*, Richters, in Möbius Meeresfauna Mauritius u. Seychellen, p. 158, is said to belong to the *Dromidæ*. One species, *Ascidiophilus caphyræformis*.]

HOMOLIDEA.

Family Homolidæ.

Homola Leach.	*Ante.*	
,, *barbata* (Fabr.).	Fabricius, Ent. Syst. emend. II. 450: Herbst, Krabben und Krebse II. iv. 166, pl. xlii. fig. 3: Latreille, Nouv. Dict. d'Hist. Nat. XV. 1817, p. 281: S. I. Smith, P. U. S. N. M. 1883, p. 24, and Albatross Crust., p. 7 in Rep. U. S. Fish. Comm. 1882 (1884) and 1884 (1886), p. 33, pl. ii. fig. 1: A. Milne Edwards and Bouvier, Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 11. *Homola spinifrons* Leach, Tr. Linn. Soc. XI. 1815, p. 324, and Zool. Miscell. II., p. 82, pl. lxxxviii. Desmarest, Consid. Gen. Crust., p. 134, pl. xvii. figs. 1, 1*a*: Risso, Hist. Nat. Europ. Mérid. V., p. 34: Milne Edwards in Cuvier Règne Anim. pl. xxxix. fig. 2, and Hist. Nat. Crust. II. 183, pl. xxii. figs. 1–4: Costa, Faun. Regn. Napol., Crust. Brach., p. 1. Heller, Crust. Südl. Europ. p. 149, pl. iv. figs. 12, 13: Brocchi, Ann. Sci. Nat. Zool. (6) II. 1875, Art. 2, p. 107 (*male appendages*): A. Milne Edwards, Bull. Mus. Comp. Zool VIII. 1880, p. 33: Carus, Prodr. Faun. Medit. I., p 498: Ortmann, Zool. Jahrb. Syst. VI. 1892, p. 542. ? *Homola spinipes* Guilding, Tr. Linn. Soc. XIV. 1825, p. 334.	Both sides of N. Atlantic. Azores, Mediterranean.
,, *vigil*, A. Milne Edwards.	Bull. Mus. Comp. Zool. VIII. 1880, p. 33: Bouvier, Bull. Soc. Philom. Paris, (8) VIII. 1895–96, p. 62.	Caribbean Sea.
,, *orientalis*, Henderson.	Challenger Anomura, 1888, p. 19, pl. ii. fig. 1: Whitelegge, Mem. Austral. Mus. IV. 1900, p. 163.	Philippines and Ki Is. Australia.
,, ANDAMANICA, Alcock.	*Ante.*	Andaman Sea.
Subgenus Homolax Alcock.	*Ante.*	
,, MEGALOPS, Alcock.	*Ante.*	Indian Seas.
Subgenus Paromola Wood-Mason.	*Ante.*	
,, *curieri* (Risso).	Risso, Hist. Nat. Europ. Mérid. V. 1826, p. 34: Roux, Crust. Medit. pl. vii: Guérin, Icon. Règne Anim. pl. xiii. fig. 1: Milne Edwards, Hist. Nat. Crust. II. 183: Costa, Faun. Regn. Napol., Crust. Brach., p. 2: Lucas, Hist. Nat. Anim. Artic. Crust. pl. xvi. fig. 1: Heller, Crust. Südl. Europe, p. 151: Carus, Prodr. Faun. Medit. I. 499: Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 512: Bouvier, Bull. Soc. Philom. Paris, (8) VIII. 1895–96, pp. 60, 77, figs. 24, 34: A. M. Edw. and Bouvier, Travailleur et Talisman, Crust. Décap. pt. I., p. 10.	Mediterranean: Atlantic nr. Canary Is.
,, PROFUNDORUM, Alc. & Anders.	*Ante.*	Arabian Sea.
Paromolopsis Wood-Mason.	*Ante.*	
,, BOASI, Wood-Mason.	*Ante.*	Indian Seas.

HYPSOPHRYS Wood-Mason.	*Ante.*	
,, SUPERCILIOSA, Wood-Mason.	*Ante.*	Arabian Sea.
,, LONGIPES, Alc. & Anders.	*Ante.*	Arabian Sea.
Homologenus Henderson.	(= *Homolopsis*, A. M. Edw., Bull. Mus. Comp. Zool. VIII. 1880, p. 34), Henderson, Challenger Anomura, p. 20: A. Milne Edwards and Bouvier, Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 12.	
,, *rostratus*, (A. M. Edw.).	Bull. Mus. Comp. Zool. VIII., 1880, p. 34, and Rec. Fig. Crust. Nouv., pl. 39, fig. 1: Bouvier, Bull. Soc. Philom., Paris (8) VIII., p. 62, fig. 25: Milne Edwards and Bouvier, Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 13, and Exp. Sci. Travailleur et Talisman, Crust. Décap. Pt. 1, p. 11, pl. i, fig. 1, pl. viii. figs. 19–21.	Both sides of N. Atlantic.
,, *sp.* Henderson.	Challenger Anomura, p. 21, pl. ii, fig. 2.	Near the Philippines.

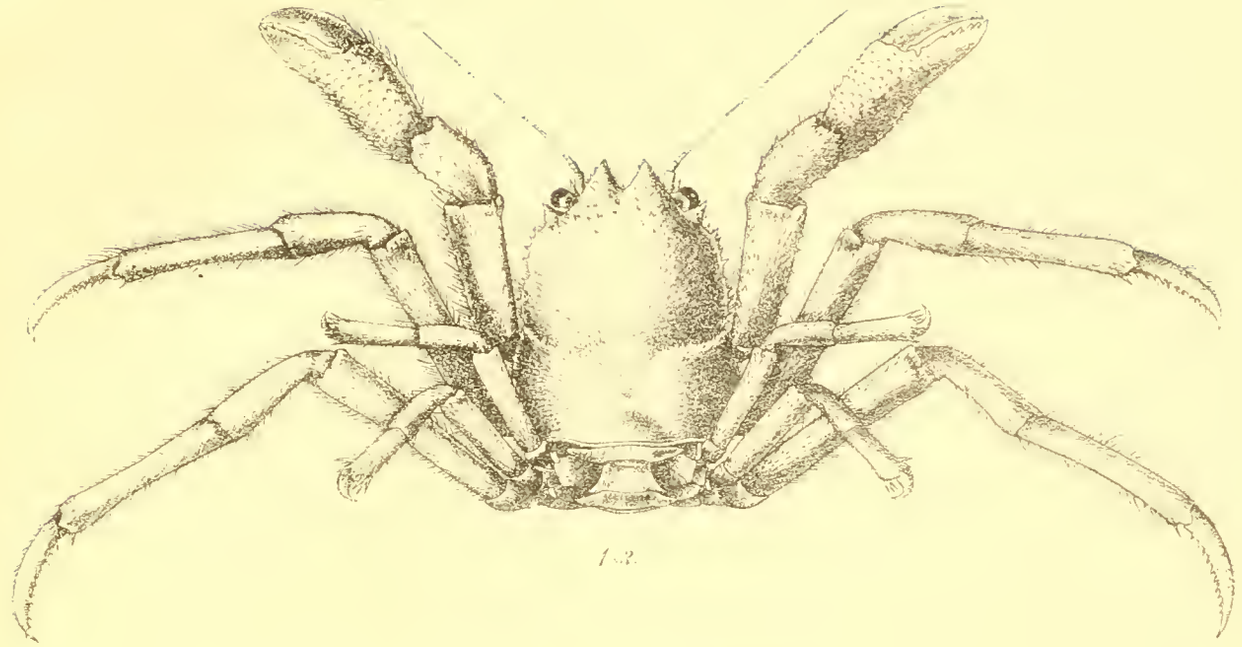
Family LATREILLIDÆ.

LATREILLIA Roux.	*Ante.*	
,, *elegans*, Roux.	Crust. Médit. pl. xxii: Milne Edwards, Hist. Nat. Crust. I. 277: Lucas, Expl. Sci. de l'Algerie, Zool., pt. 1, p. 3, Crust. pl. i. fig. 1: Heller, Crust. südl. Europ., p. 147, pl. iv. fig. 14: Smith, P. U. S. N. M., 1883, p. 23, and Albatross Crust. (in Rep. U. S. Fish. Comm., 1884), p. 7, pl. ii. figs. 2, 2*a*, pl. iii. fig. 1: Carus, Prodr. Faun. Medit. I. p. 498: Milne Edwards and Bouvier, Crust. Décap. Hirondelle, Pt. I. Monaco, 1894, p. 59, pl. vi. figs. 13–15, and Crust. Décap. Hirondelle et Princesse Alice, Monaco, 1899, p. 13, and Exp. Sci. Travailleur et Talisman, Crust. Décap., pt. 1, p. 13: Bouvier, Bull. Soc. Philom., Paris (8) VIII. 1896, p. 64, fig. 26.	Both sides of N. Atlantic: Mediterranean.
,, PENNIFERA, Alcock.	*Ante.*	Indian Seas.
,, *australiensis*, Henderson.	Challenger Anomura, 1888, p. 24, pl. ii. fig. 4: Whitelegge, Mem. Austral. Mus. IV, 1900, p. 165.	Australia.
,, *valida*, DeHaan.	Faun. Japon. Crust., p. 107, pl. xxx, fig. 1: Adams and White, Samarang Crust., p. 5: Henderson, Challenger Anomura, p. 24.	Japan.
,, *phalangium*, DeHaan.	Faun. Japon. Crust., p. 108, pl. xxx. fig. 2: Adams and White, Samarang Crust., p. 5: Ortmann, Zool. Jahrb., Syst., VI. 1892, p. 542, pl. xxvi. fig. 2.	Japan.
LATREILLOPSIS Henderson.	*Ante.*	
,, BISPINOSA, Henderson.	*Ante.*	Andamans and Philippines.

BRACHYURA

PLATES A AND I—VII.

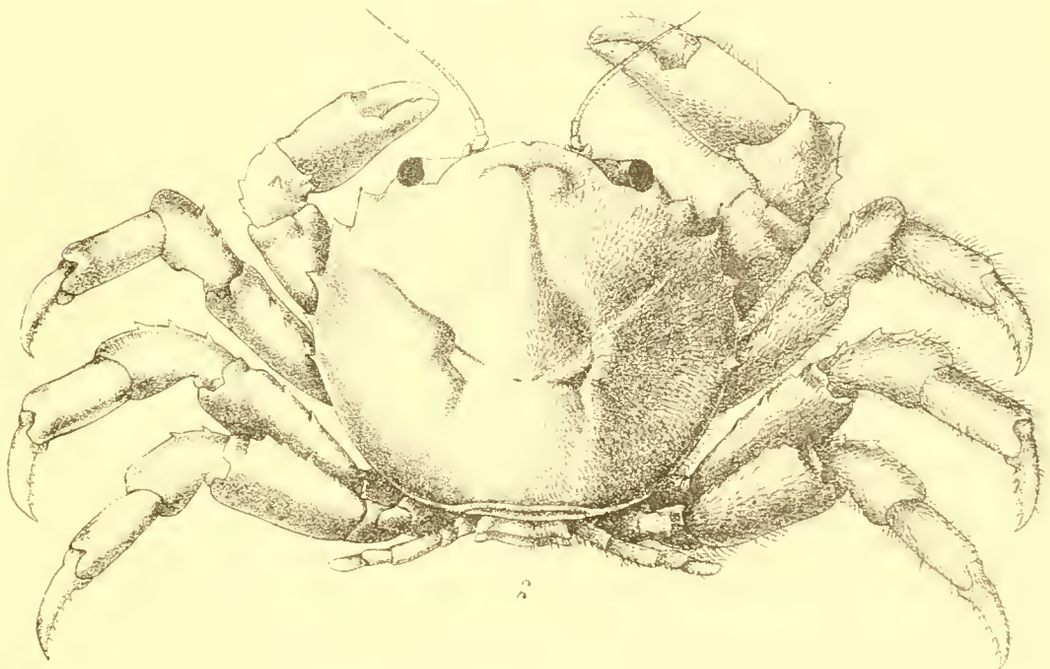
I
II
III



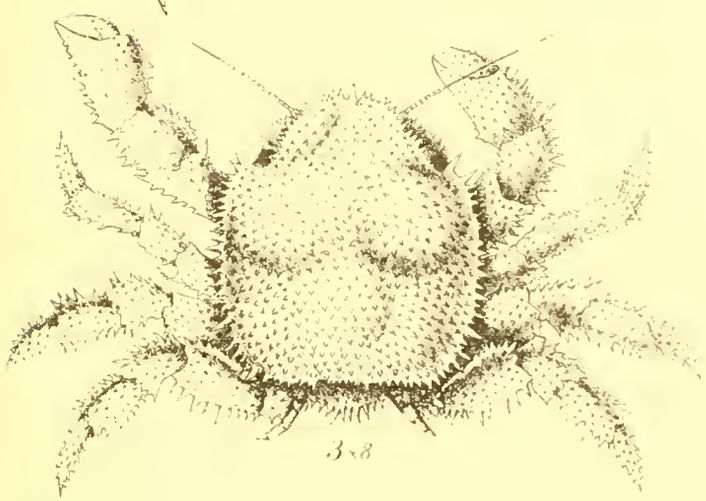
1×2.

1a×3

1b×3.



2



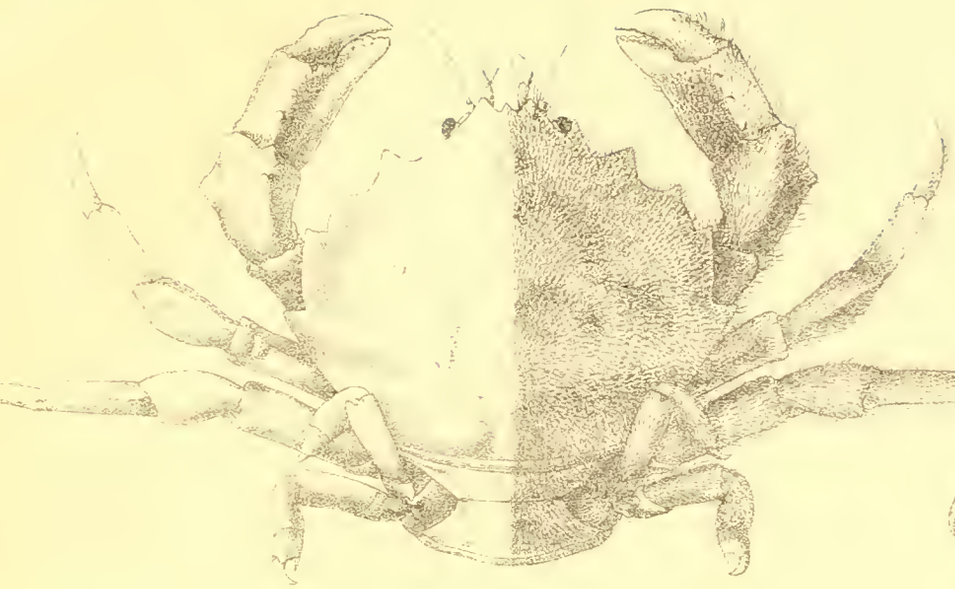
3×8

3a×8

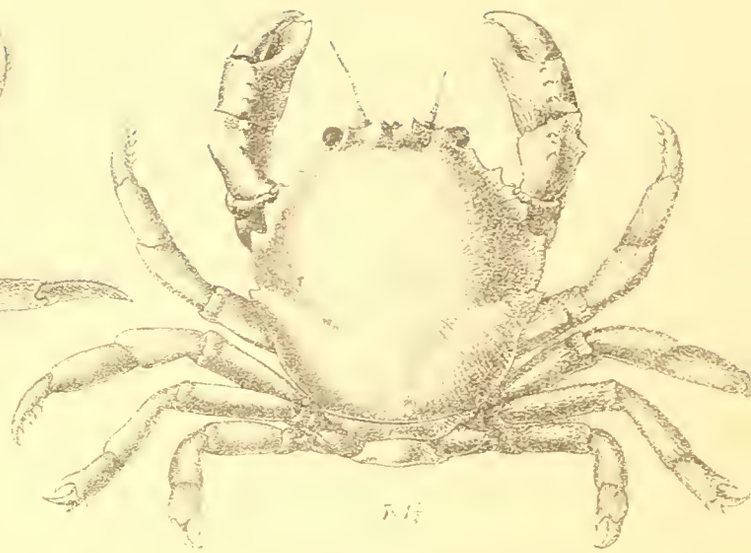
1c×3

A. L. Chowdhury & Co. Ltd. Calcutta Art Studio Lith.

1. Ixa tridentata (de Haan) ♂ ×2 ×. 2. Oxyrhyna platynota (Rüppell) ♂ ×
3. Acanthodromia erinacea (Milne Edwards) ♂ ×8



4.



5. ½

6×2.

7. 6

8×2

9a×6.

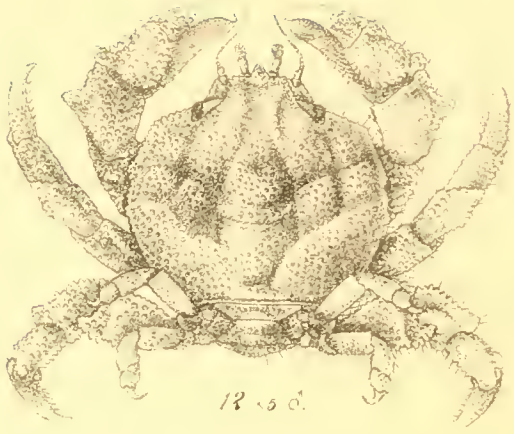
9×6.

A.C. Cowan[illegible] & J. Mon[illegible] del. et Lith.

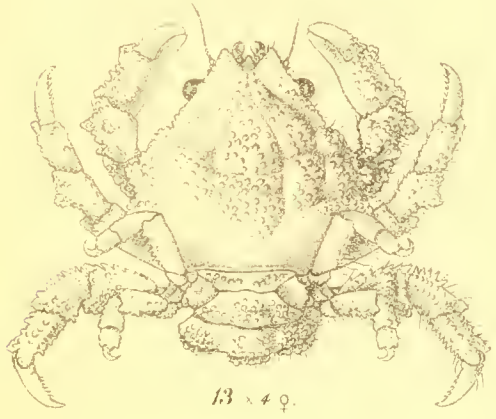
4. Dromia rumphii. 5. Dromia [illegible] × ½ Dromia [illegible] undentata × 2

7. Cryptodromia pileifera ×6. 8. Cryptodromia carinicauda ×2. 9&9a. Cryptodromia hilgendorfi ×6

11 ×3 ♂.



12 ×3 ♂.

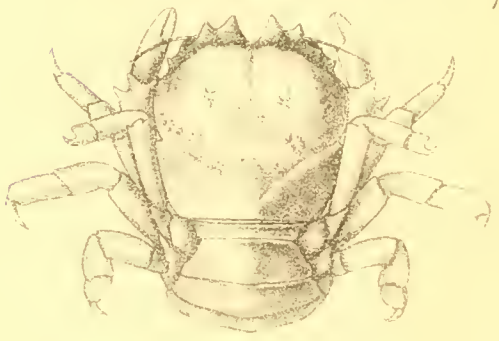


13 ×4 ♀.

14 ×3 ♂

14a ×2

15 ×4.



15a ×1

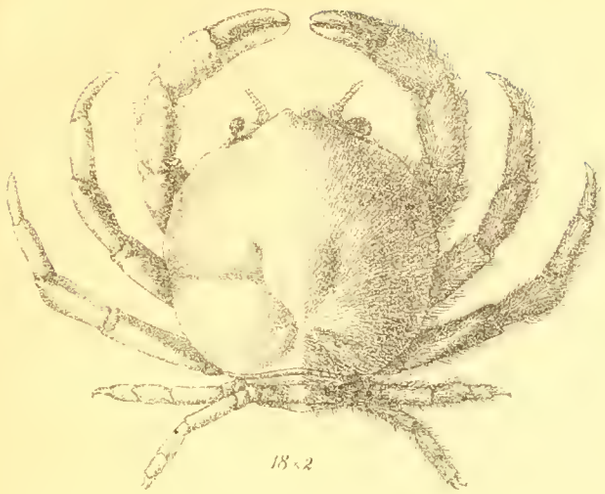
16.

17 ×3

S. C. Mondul & A. C. Chowdhury del. et Lith.

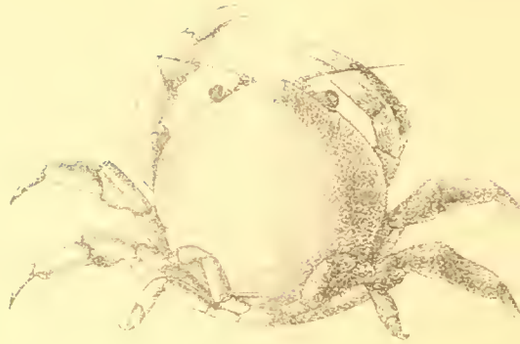
11 Cryptodromia hilgendorfi ×3. 12 Cryptodromia [illegible] ×4

14.14a Petalomera indica ×2 15.15a [illegible]

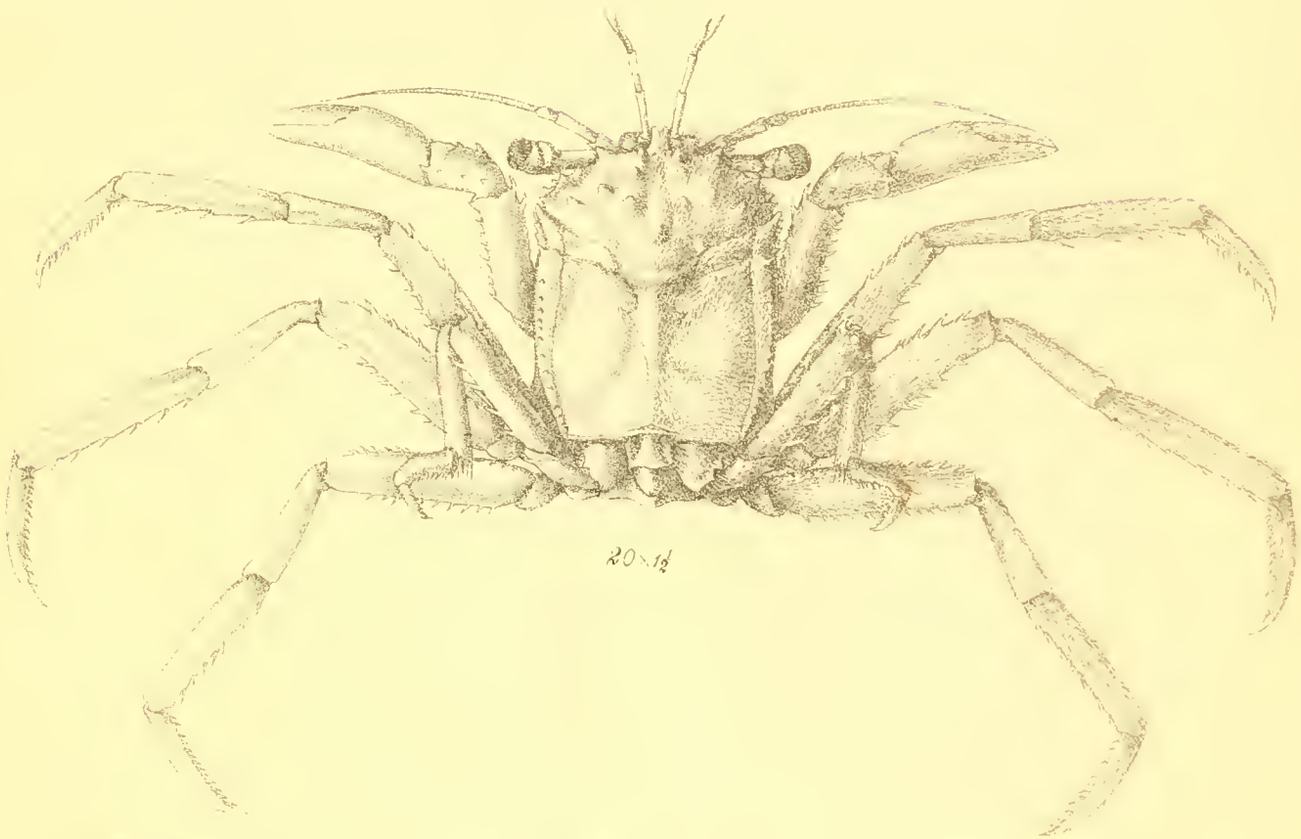


18 ×2

18a ×3.



19 ×1



20 ×1½

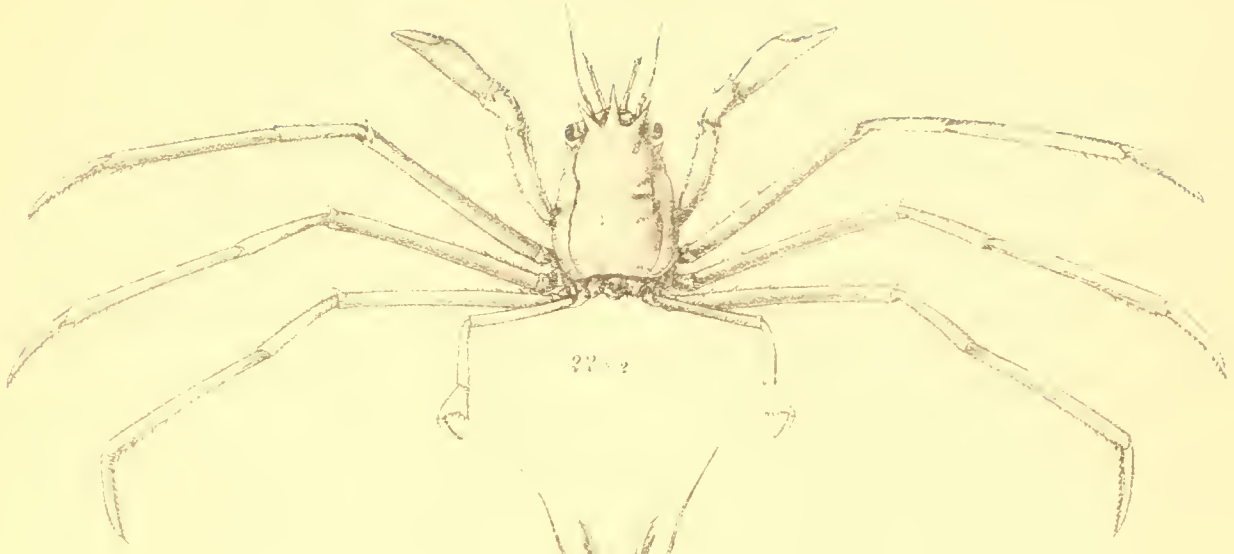
21.

21a ×2.

Mondul & A. C. Chowdhury del. et Lith.

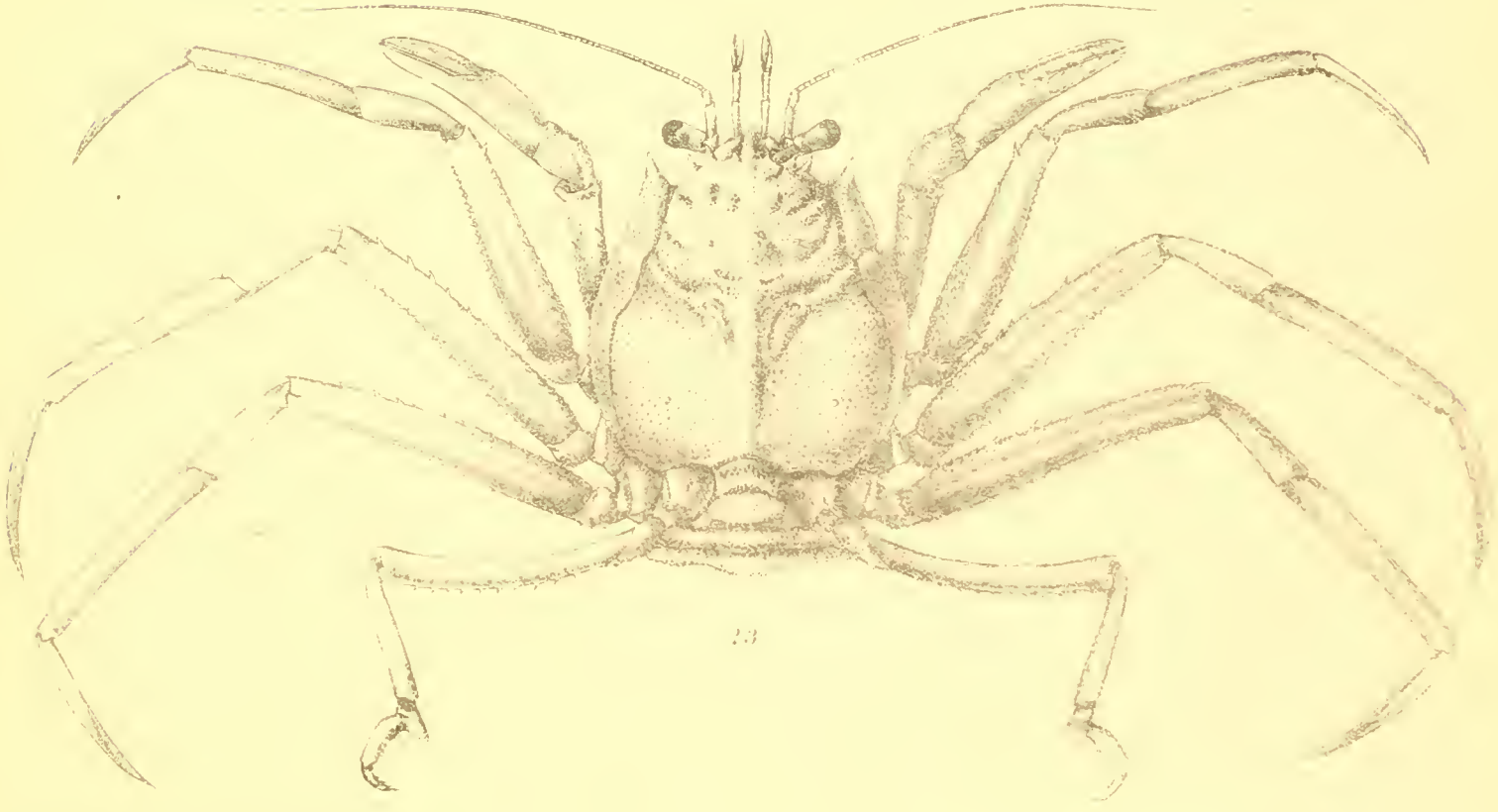
18. Macrodromia kendalli ×2.

19. Sphaero[illegible] ×1½



22 - 2

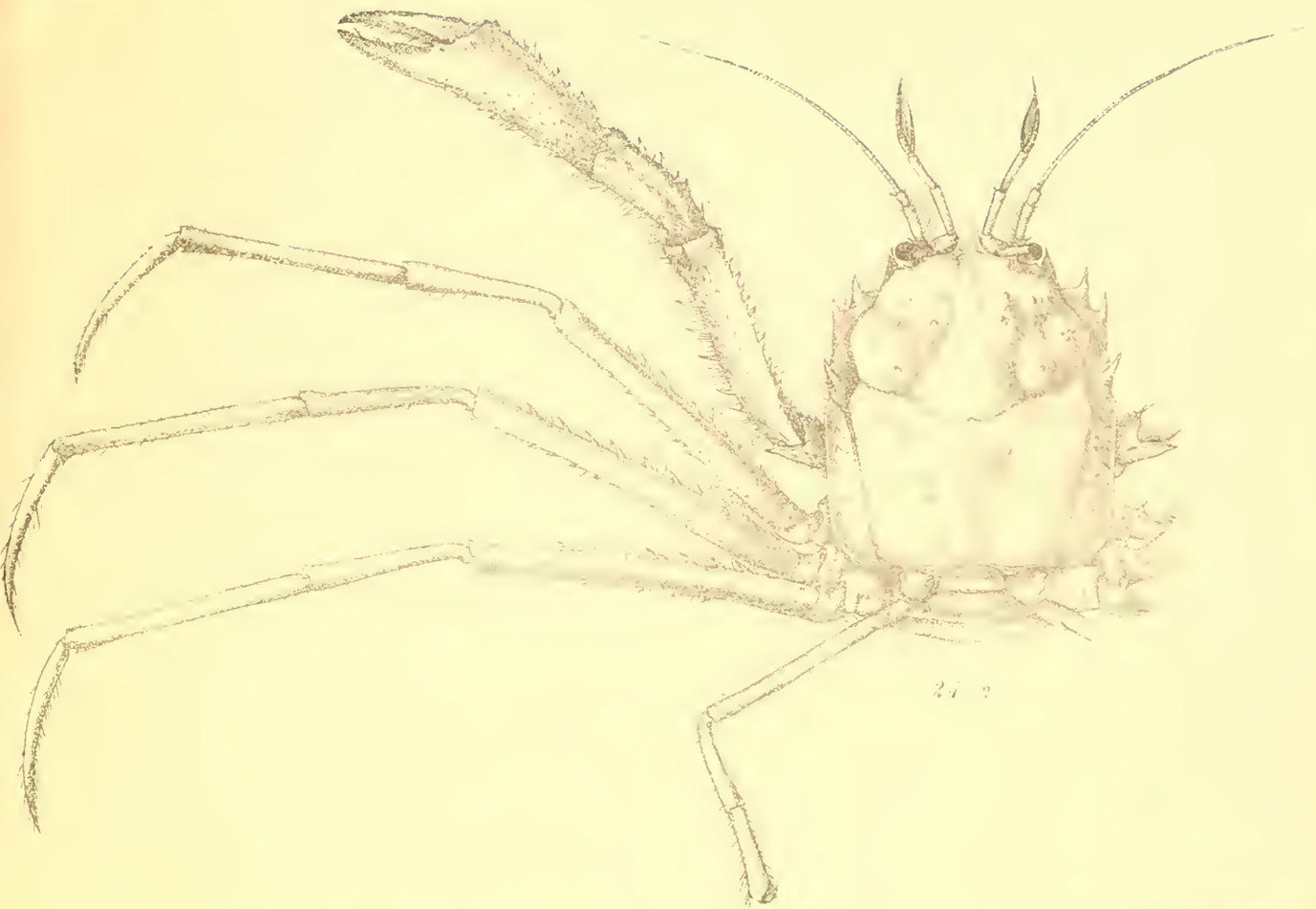
22a - 3



23

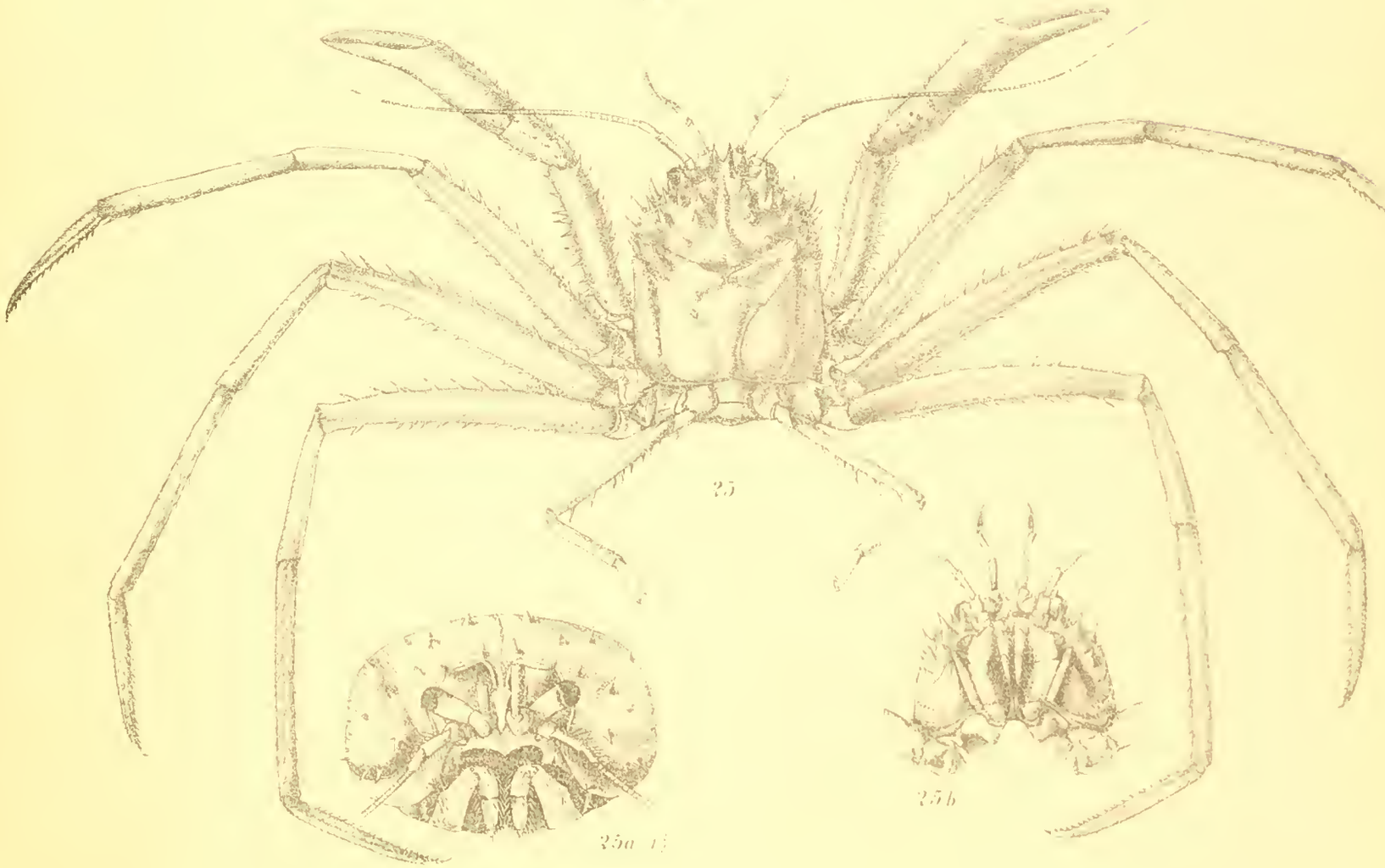
Lithy & Mendon del et Lith

E. Parent Typ Bruxelles



24

24a

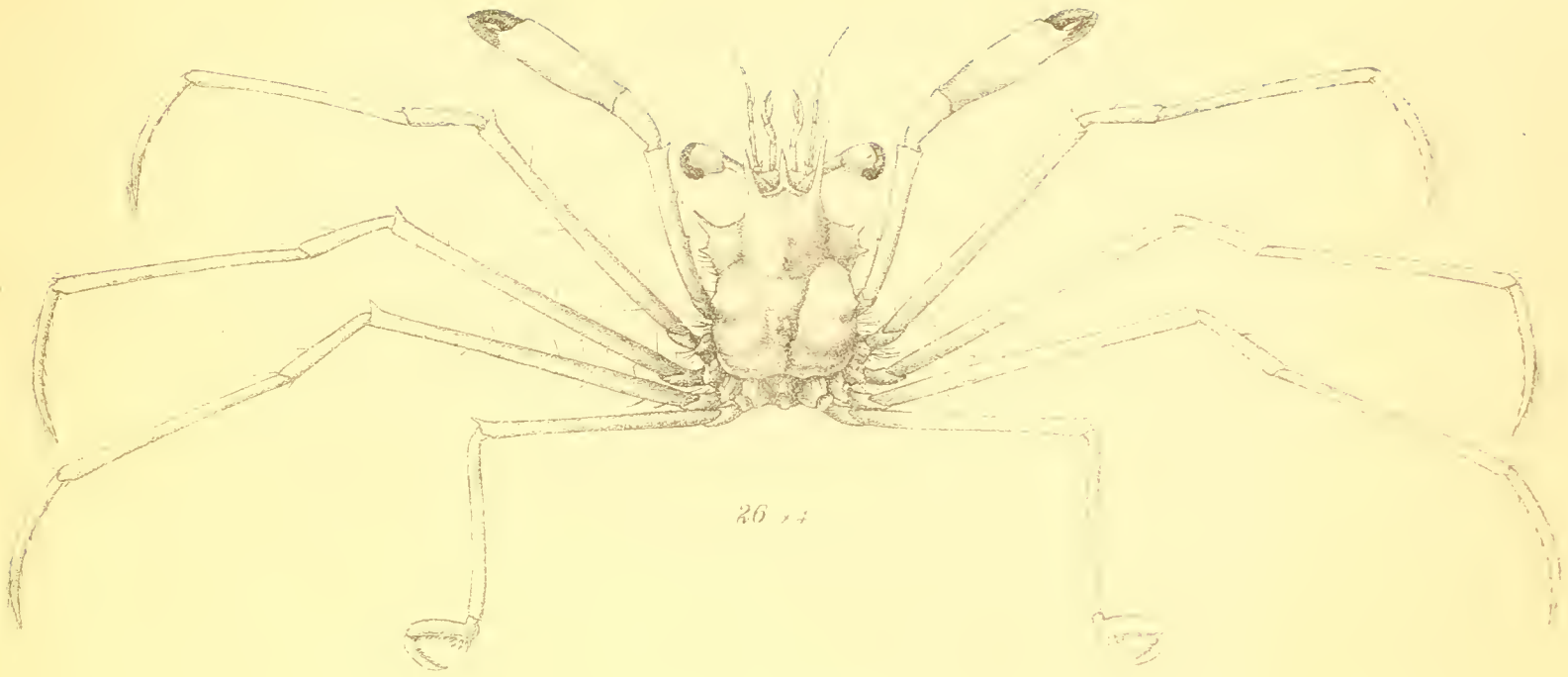


25

25a

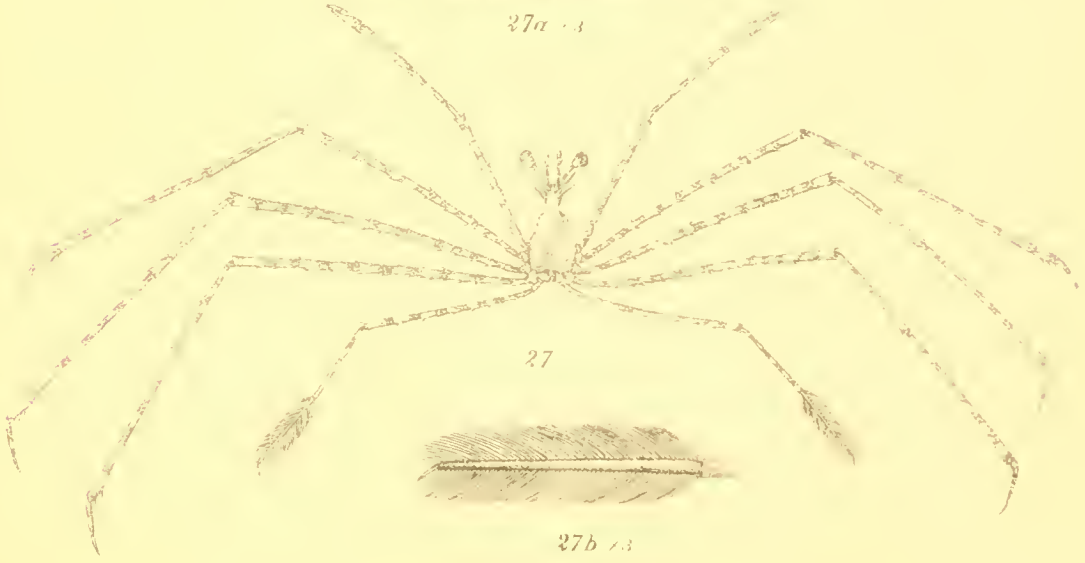
25b

A. C. Chowdhury & S. Mondul del. et lith.



26 ×4

27a ×3



27

27b ×3

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